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DISEASES OF INFANTS AND CHILDREN

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Original Communications.

THREE CASES ILLUSTRATIVE OF THE OCCURRENCE OF TYPHOID FEVER IN THE FIRST YEAR OF LIFE.*

BY J. P. CROZER GRIFFITH, M.D.,

Clinical Professor of the Diseases of Children in the University of Pennsylvania, Philadelphia.

As my often published views regarding the comparative frequency or infrequency of typhoid fever in very early life are probably well known to many of those present, I do not wish to reopen this subject further than to say that the opinion of Barthez and Sannée, J. Lewis Smith, Schavoir, Montmollin and many others, that the disease is much more frequent in infancy than is commonly supposed, is fully borne out by my own personal experience. It is to be remembered in this connection that the statistics of general hospitals offer absolutely no criterion as to its relative frequency in early life and in later years respectively, because the majority of children are either cared for at home or are taken to special hospitals for children. Even children's hospitals, too, give misleading statistics regarding the frequency of the disease in infancy, because most sick infants, especially in the first year of life, are for various reasons not entered at hospitals. The symptoms, too, at this age are often so little characteristic and so misleading that the diagnosis is perhaps oftener missed than made. Even in hospital practice this was true until in recent years the advances in our knowledge, and especially the application of the Widal serum reaction, have made diagnoses possible, which in many cases could not otherwise have been made.

That typhoid fever is relatively uncommon in infants as compared with its frequency in adults no one has ever disputed. Nevertheless, the presence last spring in the infants' ward of the Children's Hospital—which contains but ten beds—of 5 *cases* of typhoid fever at one time, in subjects none of whom had passed the age of two years, certainly is sufficient proof that the disease cannot with propriety be called rare at this time of life.

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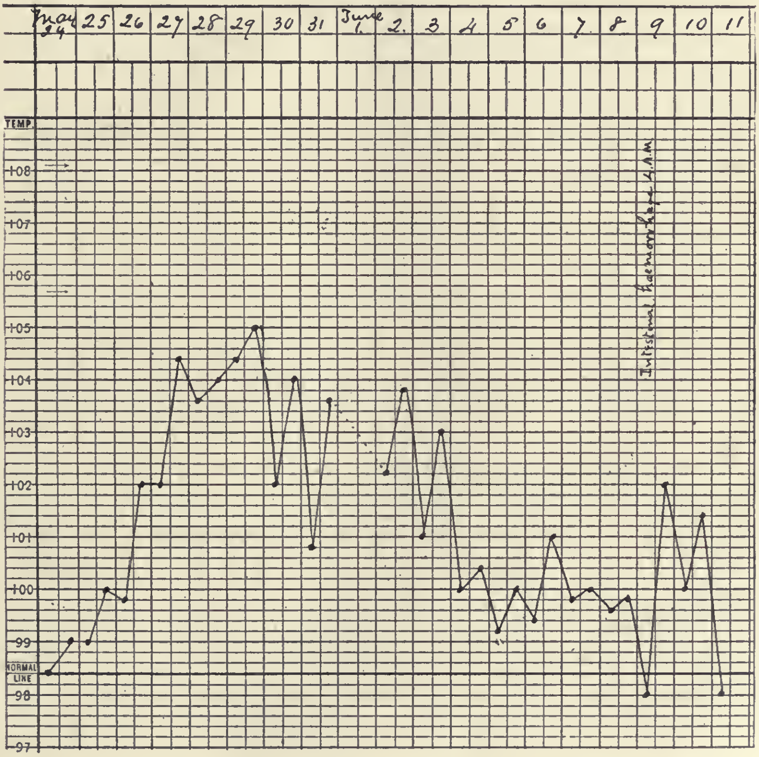
* Read at the Nineteenth Annual Meeting of the American Pediatric Society Washington, May 7, 1907.

The following 3 cases may be of interest in this connection. They occurred in infants, one aged five months, and the other two each nine months:—

CASE I. Martin D., five months old, was admitted to the Philadelphia Hospital May 12, 1902, with his mother, who was suffering from typhoid fever. He was a healthy-looking child, without any evidence of illness. This good condition continued, except for slight restlessness at night, until May 25th, when his temperature rose to 100°, and on the following day to 102°; the stools became green and watery and averaged from one to three a day; slight distention of the abdomen developed, and there was increased restlessness and considerable crying. By the 28th the child looked quite ill, food was refused, and the stools were still green. watery and offensive. Fever persisted from this date, little influenced by sponging, and on May 30th numerous quite typical rose spots were observed over the abdomen and arms, and the spleen could be felt. On June 3d, the tenth day of the disease, the Widal reaction was reported positive. By this date the rose spots had disappeared, sponging had more effect upon the temperature, diarrhea continued, vomiting was rather frequent, and the child seemed brighter. The temperature fell now rather quickly and was practically normal by June 5th, the twelfth day of the disease. Food was now retained well, and the child seemed about to convalesce except that some degree of diarrhea persisted. On the night of June 8th-9th, however, two intestinal hemorrhages occurred, estimated to consist respectively of 1 ounce and of 3 drams of bright-red blood; vomiting returned and was persistent; all food was rejected; there was decided tenderness of the abdomen, but no rigidity or tympany; the child seemed to be suffering severe abdominal pain; crying was frequent and the knees were kept drawn up; the circulation was poor; the hands and feet cold; the eyes slightly sunken; the fontanel not depressed, and the temperature normal. The child looked very ill. By the next day, June 10th, the condition had improved somewhat, the patient was brighter, the hands and feet were warm, the pain was evidently less, and food was retained. A trace of blood had appeared in the stools during the night; moderate diarrhea had continued; the temperature had risen to 102°, but was again lower, registering 99° in the morning. On the morning of June 11th the condition was about the same. Vomiting had occurred several times during the night, the legs were no longer drawn up. A rapid failure set in soon, however, and death occurred by 1 P.M. The temperature chart is appended.

CHART I.



The autopsy showed swelling of Peyer's patches, of the solitary follicles, of the mesenteric glands and of the spleen, but no ulceration whatever.

This case was interesting from many points of view. It was a typical instance of house infection, the period of incubation could be fixed as at least thirteen days, and there was the opportunity not often enjoyed of studying the fever of the stage of invasion. It will be noted that the rapid rise of temperature often seen in this stage in children was well illustrated, there being an entire absence of the slow, step-like ascent of adults. The rapid decline often characteristic of the third stage in early life was also well shown. The short course of the attack—another characteristic of typhoid fever in early life—was well exemplified, the primary febrile period in the case being unusually brief, lasting only eleven days. Finally, the case is extremely unusual in that intestinal hemorrhage took place at the early age of five months, a most exceptional occurrence. The symptoms in the last few days of life also strongly suggested the occurrence of a perforation. The autopsy, however, not only failed to show any, but demonstrated the entire absence of ulceration, a condition characteristic of fetal typhoid fever, and often also seen in the first year of life.

CASE II. Irene T., nine months old, was seen in consultation with Dr. Joseph M. Asher on January 1, 1907. The child was first visited by Dr. Asher on December 29, 1906. She had been feverish for the last four or five days and was supposed to be teething. The bowels were constipated, vomiting had occurred once, there was slight cough; the temperature in the evening of this date was 104.4°. The baby was quite pale; the tongue was clean; the tonsils were congested; the abdomen was slightly distended; there was no enlargement of the lymphatic glands and no rigidity of the neck. Several typical rose spots were visible on the upper part of the abdomen. The spleen could not be felt. There were a few moist râles in both lungs posteriorly.

The previous history was extremely interesting. The baby, generally in good health, had been nursed during the first six months of life. For the past three months she had been bottle-fed, the food consisting of a mixture of unusually pure milk and distilled water, the whole being pasteurized. It was clearly impossible that typhoid germs could have been introduced in the food. Distilled water was given to drink several times a day. It was discovered, however, that it had been the custom of the mother on putting the baby in the tub for its daily bath to cleanse the mouth with some of the spigot water. Entrance of the germs probably occurred in this manner.

On December 30th the cough was rather worse, and a specimen of blood was taken to be examined for the serum reaction. I saw the case with Dr. Asher on January 1st. Examination showed a child who was decidedly pale, rather plump, the abdomen quite distended, the edge of the spleen distinctly palpable, and typical typhoid spots numerous. A few large râles could be heard over both lungs. The report of a positive Widal reaction was received on this date.

The case ran, on the whole, a very favorable course, except for nervous twitching, diarrhea and cold extremities occurring on January 2d. Cough continued, but was not troublesome; the abdomen remaining moderately distended; the bowels were opened two to four times a day; warm tub baths were administered when the temperature was high and were borne well. By the middle of January the rose spots had disappeared, the spleen could no longer be felt, and the temperature was decidedly lower. By January 17th fever had disappeared.

Anorexia continued until January 25th, when fever returned, and in two days was again at full height. The spleen again became palpable and rose spots reappeared. The child was evidently suffering a typical relapse. Some tendency to diarrhea persisted during this attack, but in other respects the symptoms were favorable. By February 10th the spots and splenic enlargement had disappeared. After this date a slight irregular fever continued for a time, apparently depending upon the development of groups of furuncles and a tendency to gastric indigestion. Recovery was finally complete. The course of the temperature is shown in the accompanying charts.

This case is especially interesting in showing that even the early age of the patient in no way militated against the occurrence of relapse; as, indeed, there was no reason to expect that it should. It also illustrates the evidently short duration of the initial stage both in the first attack and in the relapse, and the short continuance of the third stage in the primary attack, the complicating furunculosis vitiating a positive observation on this point in the second attack. The first attack probably lasted twenty-one days; the relapse twenty days or less.

CASE III. Ada S., aged nine months. The family history was peculiar and interesting. Over a year previously the father passed through an attack of typhoid fever at his home. About six weeks after the fever had disappeared, while he was

CHART 2.

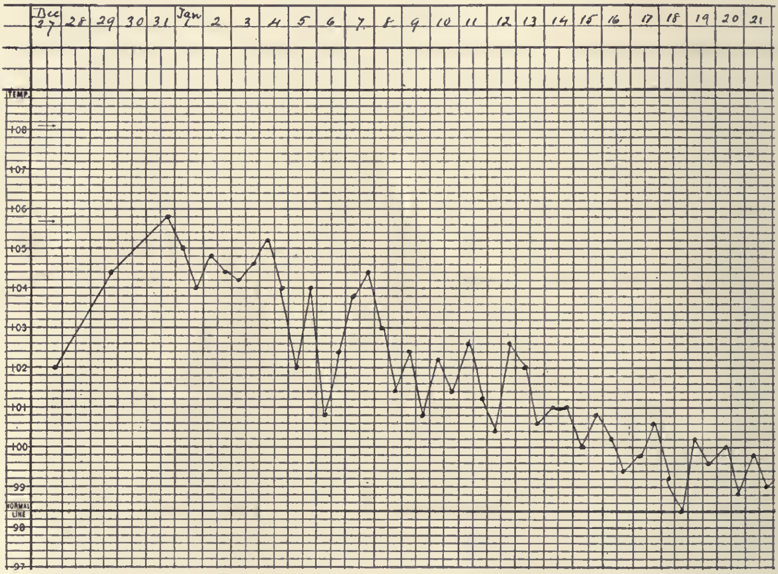
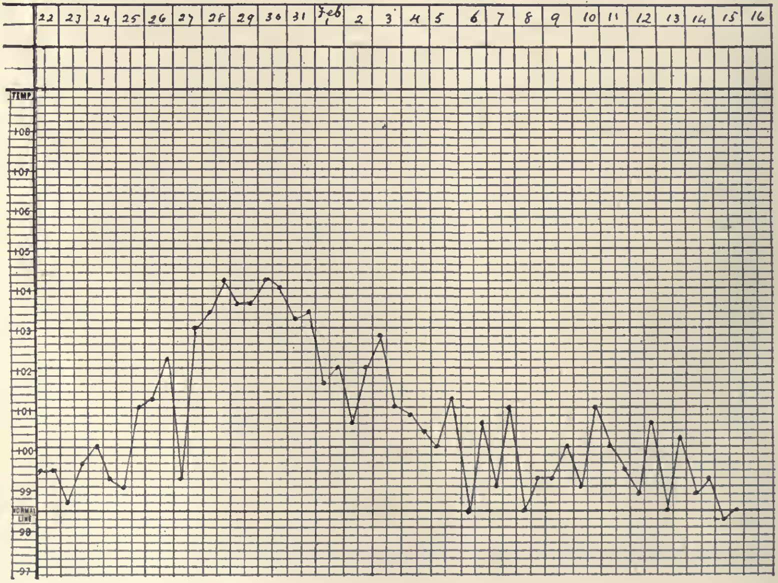


CHART 3.



still unable to go to work, one of the children of the family, a brother of the patient, was stricken with the disease and was removed to the Children's Homeopathic Hospital. After five weeks he was sent home convalescent, but developed a relapse and was returned to the hospital. After a second stay here, lasting three weeks, he was again sent home some time in the spring of 1906. About three weeks later a sister, aged six years, came down with the disease, and was sent to the Children's Hospital of Philadelphia. The attack appears to have been prolonged and rather severe, for she was in the wards for eleven weeks or more, and was then transferred to the Country Branch, where she spent a month or longer. She returned home in the autumn of 1906, well, except for abscesses of the scalp and arms.

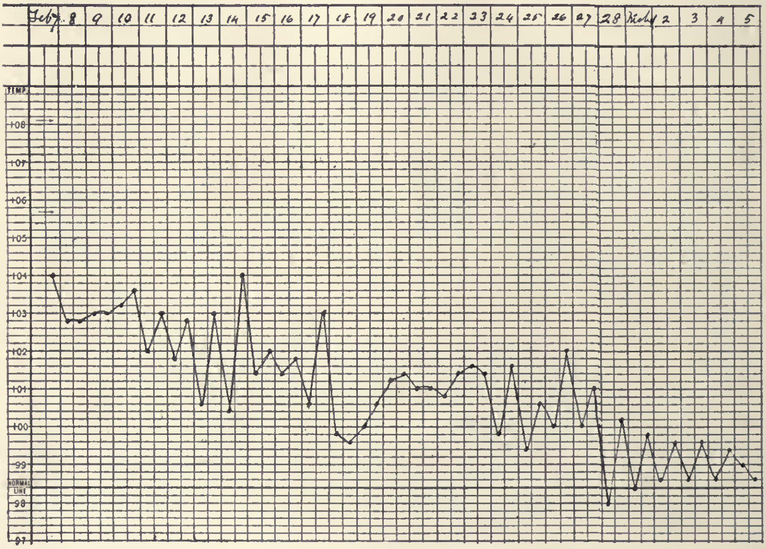
The patient, Ada, had herself been a healthy child until about the middle of January, 1907, when she began to suffer symptoms which were attributed to "teething." These consisted of occasional vomiting, loss of appetite, fretfulness, loss of strength and flesh and some diarrhea, the stools being slimy, green and occasionally slightly bloody. No epistaxis occurred. The diarrhea improved considerably, but the child was still far from well, and she was therefore entered at the Children's Hospital February 7, 1907. The patient had been fed partly at the breast, partly on undiluted and unboiled cow's milk; no water had been given to drink, but the infant's mouth had been washed regularly with boiled water. The rubber nipples had been kept in cold water drawn from the spigot, the bottles washed with boiled water, and then rinsed with cold unboiled spigot water.

On examination after admission the general condition was found to be fairly good; distinct rachitic alteration of the head and of the ribs was present; the abdomen was soft and moderately distended; the spleen could be felt, and a number of rose spots were discovered on the abdomen. An examination of the blood on February 7th showed hemoglobin, 75 per cent.; leukocytes, 9,760, and a positive Widal reaction.

Her condition while in the hospital continued fairly good, except for a continued and decided loss of weight and a very troublesome tendency to repeated vomiting. This latter was generally controlled by temporary change of diet and appropriate medication. There were no nervous symptoms; a loose cough was frequent; the spleen was palpable; the appetite poor. The rose spots persisted for a considerable time, but eventually disappeared. The stools continued moderately loose. The temperature is shown in the accompanying chart.

The normal course of the disease was interfered with by the development by the middle of February of a large abscess over the sacrum and, later, by the occurrence of suppurative otitis media, gonorrheal vulvovaginitis, persistent tendency to indigestion and, finally, diphtheria. On account of the latter she was removed to the Municipal Hospital March 22d. The continued elevation of temperature made it impossible to determine when the attack was over, although the temperature chart would indicate that somewhere about March 1st might be assumed as the date.

CHART 4.



The treatment was merely supportive and directed against the complications. Tub baths were given occasionally during the first week. They were borne well but exercised little effect upon the temperature.

The origin of the infection in this case can only be surmised. The curious family history awakens the suspicion of direct contagion, and of the long persistence of typhoid germs somewhere within the house. At the same time the use of unboiled water on the bottle and nipples and the feeding of unboiled milk may have been the source of the disease.

DISCUSSION.

DR. EATON.—I think there are a great many more cases of typhoid in young children than we are aware of. In Pittsburg we have a good many. Dr. Edwards, Dr. Small and myself tabulated a number of cases this year. I had 1 case nine months of age, with all the typical characteristics of typhoid. The only method left open for infection in this case was that when the baby was put in the tub it would bend forward and lap up the water. An older child, one of four years of age, in the same family, a year before had typhoid where the probable source of infection was the water from the sponge which it would suck while in the bath tub. We have had two series of cases, one of 160 and one of 180 under twelve years of age.

THE TREATMENT OF SCARLET FEVER.—To avoid the infection of the home on the return of scarlet fever patients from the hospital, Schiek has adopted the following plan, with good results: The patients in the hospital are divided into three classes, those in the early, middle and convalescent periods. These are isolated from one another and a patient passing from one division to another is bathed and receives a change of clothing. By this means the danger that a child may be a carrier of the disease is reduced to a minimum. Uncomplicated cases are discarded at the end of six weeks with the advice that they be sent for two weeks to the house of relatives who have no children. The treatment consists chiefly in rest in bed, and a diet without meat, with cardiac stimulants freely used where indicated. Moser's serum has given excellent results. (This is anti-streptococcus serum made by using streptococci from the heart's blood of scarlatina patients for the injections of horses without intermediate passage through animals.) It must be given in the first few days to be of benefit, and so used, in the dose of 200 c.c. subcutaneously, apparently aborts the disease. It does not, however, avert heart and kidney complications.—*Boston Medical and Surgical Journal.*

HEMOTHORAX.—A CASE.—INFANT FIVE MONTHS OLD.—ASPIRATION.—RECOVERY.*

BY W. P. NORTHRUP, M.D.,
New York.

Apart from symptoms connected with the chest, the history of the present case is negative. Looking backward from the present time of writing, the events of birth and first three months of life are negligible.

The present illness began with gradual onset, and up to the time of my connection with the case the history mentioned only labored breathing and cyanosis, with some suggestion of cardiac excitement. There was no mention of dullness, no fever and no sure evidence concerning râles. The patient was seen three times by a well-known specialist, who pronounced the case on his first two visits to be dry bronchitis, and on the third pronounced the case quite well, admonishing the parents that they were overnervous and that was all there was about it.

It was a month later when I saw the infant. The above report coming through the memory of two witnesses, together with their own added observations, leaves the history difficult to interpret.

Let it be remembered that this portion of the history at least is probable—that the child had been sick two months out of its five months of life; that the onset of the present difficulty was gradual; that there had never been any fever; that ultimately there was marked dyspnea; respirations, 50 to 80 per minute; occasional cyanosis, restlessness. It was difficult to ascertain whether urgent symptoms had developed rather rapidly, or whether the whole complex had developed gradually.

The manifestations at the time of my first observations were these: A poorly-developed child for five months of life, underweight, but not emaciated; pale, breathing 80 per minute while quiet. Left chest less expansive than the right, flat on percussion from top to bottom, with exaggerated breathing, and in places bronchovesicular at apex in front. No respiratory murmur over the lower portions or in axillary line. The heart was displaced to the right, cardiac dullness reaching one to one and one-half inches to the right of the sternum. Never any fever.

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* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 7, 1907.

Before examining the patient I was cautioned that disturbing the child would probably induce a "bad turn." The child had these bad turns occasionally, anyway, but now the friends and physicians feared to disturb it at all. The features of the attacks were difficult to describe, but the attacks were rather alarming. This I soon found to be true, and, though forewarned and doubly cautious in handling the child, I had my own experience with the case. Taking the infant on a pillow, laying it in the good light before the window, nothing happened so long as the infant lay quietly on its back and did not become excited, did not cry, did not swallow liquids; in short, so long as it lay perfectly quiet and tranquil, without bodily or mental disturbance. All went well until the child was gently turned toward its right side. Directly certain symptoms caused the doctors to say: "He's going to have an attack now," or "He's getting an attack," "Shall we get the oxygen?" The pulse recorded a few staggering impulses, the skin became cyanotic, premonitory gasps suggested a prompt cessation of all vital functions. The child was, needless to remind you, turned at once on its back. Oxygen, which had been always in readiness, was administered and with, fortunately, its usual good results. The heart gave a few irregular strokes against the chest wall, then beat intermittingly, the color meantime changing from deep cyanosis to a dull leaden color. At length the heart, color and general condition returned to their habitual state. Respirations after this attack, even when the child was lying quietly on its back, with eyes closed, were 80 to 100.

One of the physicians present was an X-ray enthusiast and expert and possessed a portable apparatus. We thought it best to leave the infant undisturbed for the time being and at a favorable moment to secure an X-ray picture of the chest. The X-ray negative is here and you will recognize a typical illustration of a chest well filled with opaque fluid; heart displacement likewise well shown.

On a second visit, with due precautions and with slightest possible anesthesia, a Potain aspirating apparatus was employed to withdraw the fluid. The needle was inserted in the sixth space, axillary line, the child lying on its back. Everything went well.

The room in which the aspiration was performed was rather dark, the light being derived from a high gas flame. Fluid was reached in the easiest possible way through the thin chest wall and farthest possible from the heart and great vessels. No one noted at first the color of the fluid. The fact that fluid was running freely, that the condition of the child was most important to observe, kept our minds active between anesthesia (which was partial and short), pulse behavior and fluid. After a few seconds, which seemed longer, we noted that the fluid was black or seemed so in the indistinct light. The child's condition was good, and we held our course. Two ounces flowed readily into a bottle which, to me at least, unexpectedly proved to be of amber-colored glass. Two ounces we deemed a sufficient amount for one tapping and the fluid proved to be blood.

There were no threatening symptoms during or following the aspiration. The child's pulse improved at once; the heart returned nearly to its normal position; general condition improved. The subsequent course of the case to complete recovery was rapid and uneventful.

The blood was fluid, gave the impression of containing rather more serum than normal, was very dark like a blood clot, contained apparently no pus and no shreds. The blood coagulated quickly in the bottle.

Blood examination by Dr. W. R. Williams was reported as follows:—The material submitted for examination consisted of about 70 c.c. of unclotted liquid, opaque, of the color of blood and of a specific gravity of 1.032.

The red cells were well preserved, the leukocytes were not abnormally abundant. An exact differential count of the leukocytes was not made, but the percentages of the various types seemed about that of normal blood.

Examination of smears for tubercle bacilli was negative. Because of the evident contamination of the liquid a careful bacteriological examination was not made. The liquid was a mixture of serum with a large amount of blood.

Upon standing, the blood became laked and an odor of putrefaction developed. Subsequent history disclosed the fact that the specimen was not sent to the pathologist for several days.

The child's condition was reported favorable from time to time. On the third visit, two weeks later, it was proposed to remove the remaining blood by aspiration. It was believed that 2 ounces was not all the contained blood, and further aspiration would probably be necessary. On examining the infant, however, the heart was found to be in place, the breathing signs perfect in all parts of the lung. In short, no one could tell from examinations and the child's condition that it had had anything in its pleura, and if told that one side had contained a large quantity of fluid (in proportion to the size of the chest) one could not tell on which side it had been.

It is now more than a year since the aspiration, the child is a year and five months old, and the only cause of anxiety to the overanxious parents is rapid respiration. Dr. Jacobi has seen the case in his office, and as I understand has not found anything definitely wrong with the child. Its respirations are rapid on occasions, and if correctly reported he attributes it to some abnormality, possibly, but the nature of it is undiscoverable.

I am indebted to Dr. Marcus I. Blank, whose case it was, and to Dr. I. L. Feinberg, for two excellent X-ray pictures, which help much to make the history complete.

I can give no explanation of the cause of the hemothorax. There was no history of accident, no tubercle bacilli were found and no signs of tuberculosis have since been discovered. There was no hemorrhagic condition—purpura or scurvy; no disease of other serous membranes, no malignant growth, no syphilis, no evidence of thrombosis, no murmurs in the heart. Nine months after the aspiration the child is said to have had pneumonia, running a ten-day course, with maximum temperature of 104° F., followed by normal convalescence. The child has had this extraordinary history and now a year later is well and thriving.

THE BACTERIOLOGY OF THE SUMMER DIARRHEA.—Morgan, in his recent researches on the bacteriology of summer diarrhea in infants, has found a hitherto undescribed bacillus, which preponderated among all non-lactose fermenting bacilli. It differs from the bacillus of hog cholera of McFadyan, from the B. Enteritidis of Gaertner and the B. Dysenteriæ of Flexner. He believes that the type of summer diarrhea of infants in America is clinically and bacteriologically different from that in England. —*Boston Medical and Surgical Journal.*

MYXEDEMA (WITH REPORT OF A CASE).*

BY A. M. DAVIS, M.D.,

Germantown, Pa.

Myxedema, or sporadic cretinism, is described as a chronic functional disorder of cellular metabolism, due to structural alteration of the thyroid body and inhibition of its physiological functions. The disease was first described a little more than twenty years ago by Sir William Gull (1873), who termed it "cretinoid change." In 1877 Ord described its manifestations, gave it its present name, the latter reading a communication on "Myxedema, a Term Proposed to be Applied to an Essential Condition in the Cretinoid Affection, Occasionally Observed in Middle-Aged Women" before the Royal Medical and Chirurgical Society of London. Charcot, in 1881, described it under the name of "Cachexiæ Pachydermique." The name was applied because pieces of edematous skin yielded an excess of mucus, and this mucous edema was then considered to be a most characteristic feature of the condition.

As to the nature and pathogenesis of myxedema, investigations by the Clinical Society of London, in 1885, showed it to be identical with cachexia strumipriva, and closely allied to endemic cretinism; the condition present depending on loss of function due to disease of the thyroid gland.

In that year Kocher described a condition which appeared in patients on whom he had performed thyroidectomy for goitre, to which he gave the name "Cachexia Strumipriva," but did not attribute the condition to removal of the thyroid, but to a chronic asphyxia which occurred from injuries received in the adjacent structures during its removal. Afterward, Felix Simon noted the similarity of symptoms which occurred in myxedema and cachexia strumipriva, and ascribed the loss of the thyroid as the common etiological factor. Normally, the active thyroid is supposed to secrete some essential substance which maintains normal metabolism, the active principle of which (although called thyroidin) has never been isolated. A substance called "thyroidin" has been extracted from the thyroid glands of sheep, and possesses certain therapeutic properties. In *Virchow's Archives,* Munk denies absolutely that the removal of the thyroid in animals inevitably leads to myxedema, having never seen the latter develop in animals. He has succeeded in removing thyroids in apes, under aseptic precautions, which were reported in good health nearly a year following the operation. This assertion agrees with Cunningham (*Journal of Experimental Medicine,* 1898), who argues that the symptoms of induced thyroidism are manifestations of an intoxication resulting from the ingestion of decomposed thyroid material. "The ingestion of many substances derived from other animal tissues than the thyroid may," he says, "produce an intoxication strikingly similar to that of experimental thyroidism." On the other hand, pathologists all agree that, with rare exceptions, there is a well-marked atrophy of the thyroid in myxedema, while Ord (*British Medical Journal,* 1898) states that this disease, in common with sporadic cretinism of children and cachexia strumipriva, is dependent on a loss of function of the thyroid gland. The therapeutic test would seem to corroborate this view.

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* Read before the Northwestern Branch of the Philadelphia County Medical Society, June 20, 1907.

Etiology.—The etiological factors, with the exception of heredity and sex, seem to be varied, having been mostly observed in individual cases. About 25 per cent. of cases, according to Hun, have been observed in men, and hereditary transmission through the mother has been observed. It is most common among married women of forty or forty-five years of age. Exophthalmic goitre may precede myxedema, symptoms of the latter, however, disappearing with the cure of the goitre. It has been known to follow the exanthemata; rheumatism, erysipelas, malaria and tuberculosis are spoken of as predisposing to its occurrence. Climate seems to have some part as a predisposing cause, the disease rarely occurring in the tropics and being unknown in the colored races. It is found most commonly in the north of England, and in some parts of Scotland and America. In Ireland, Germany and Belgium it is rare, and in Norway only 4 cases have been reported. Osler reports the case of a married woman in which the symptoms disappeared during pregnancy.

Two varieties of myxedema may be mentioned. First, that resulting from the destruction of gland tissue by disease. Under this may be mentioned a subvariety, *i.e.,* the infantile form, which is congenital, or occurs in early childhood, being known as cretinism, The second variety is that in which the condition follows the removal of the thyroid gland by operation. The disease may occur in the endemic or sporadic form, the former occurring in certain districts of some countries, and being characterized by enlargement of the thyroid gland, the victims being known as "goitrous cretins." The sporadic form is associated with absence or atrophy of the gland, as in the adult form of the disease.

The classical symptoms of cretinism are as follows:—"The child at the end of its first year is known to be 'backward.' It is stunted and mentally dull. The head, hands and feet may seem unusually large in proportion to the size of the trunk and limbs. The face is stupid and heavy, and the eyes dull. The palpebral openings are narrow and elongated, and the nose is broad and flat, with heavy nostrils. The lips are coarse, and the tongue, which is greatly swollen, protrudes; the saliva dribbles. The legs are short and bent, as in rickets, and the skin is sallow and greasy. The abdomen is usually very much protruded, due to antero-posterior curvature of the spine, and the hair is usually scanty and straight. Mentally, the child shows but little intelligence, being often vicious and uncleanly in its habits." (Hare.)

The subcutaneous tissues are firm and resisting when struck, and do *not* pit on pressure. The swelling is usually most marked over the face, neck and supraclavicular spaces. The extremities are thickened and flattened, the hand being spade-like (Gull), the fingers blunt, and sometimes square instead of round.

In adults, dryness and roughness of the skin is another marked feature of the disease, that covering the extremities being often raspy and rough. The face becomes broad and expressionless, the ears being thickened and cyanosed, the eyelids drooping over the eyeballs, giving the patient a sleepy appearance. The teeth become brittle and may eventually drop out, and the gums bleed easily. The soft palate and uvula are thickened and translucent, and the mucous membranes of the oral and nasopharyngeal cavities show marked pallor.

Stubborn epistaxis, ulcerative stomatitis, tumefaction of the mucous membranes of the larynx and trachea, and intestinal and uterine hemorrhages may persist, in spite of treatment, and cause death. Muscular weakness and exhaustion upon slight exertion are prominent symptoms. The patient stands with difficulty, and fibrillary tremors are often noticed. Paralysis occurred in about 9 per cent. of the cases reported.

Another prominent symptom is slow intellection. Mental apathy becomes more and more marked as the disease progresses. At first, mental action when started seems hyperactive, the patient becomes voluble and even animated, and sometimes violent under the influence of anger. Loss of coordination and ataxic gait have been noticed, and vertigo is not an uncommon symptom. The urine is usually diminished in amount; the amount of urea excreted being about one-half the normal. Glycosuria has been observed in some cases. The blood shows a marked diminution of hemoglobin. Autopsy has revealed fatty nodules in place of the thyroid, and an excess of fluid in the ventricles of the brain.

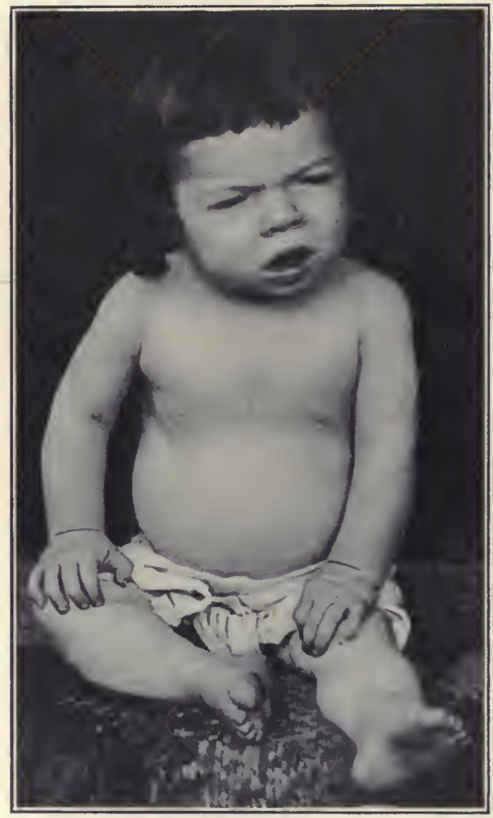
The duration of an untreated case varies, according to Combe, from six to twenty years. Exacerbations and remissions are the rule, the patient dying more often of some intercurrent affection than of exhaustion. With timely and appropriate treatment the progress is good.

The two diseases with which myxedema may be confounded are exophthalmic goitre and chronic nephritis. The symptoms of exophthalmic goitre may precede those of myxedema, or occur at the same time, thus obscuring its diagnosis.

In goitre, the cardiovascular signs, *i.e.,* pulsating carotids, accentuated valvular and muscular heart sounds, together with the exophthalmos, profound nervous symptoms, and absence of edema, would tend to render the differential diagnosis clear; whereas in nephritis the character and location of the edema, occurrence of casts, and absence of alteration in the size of the thyroid, and of the peculiar mental symptoms would easily establish the condition. In children who develop rickets, the stunted growth and physical deformity may suggest cretinism, but the former occurs chiefly in the colored race, together with the rachitic rosary, knock-knee and pigeon-breast, all of which are absent in cretinism.

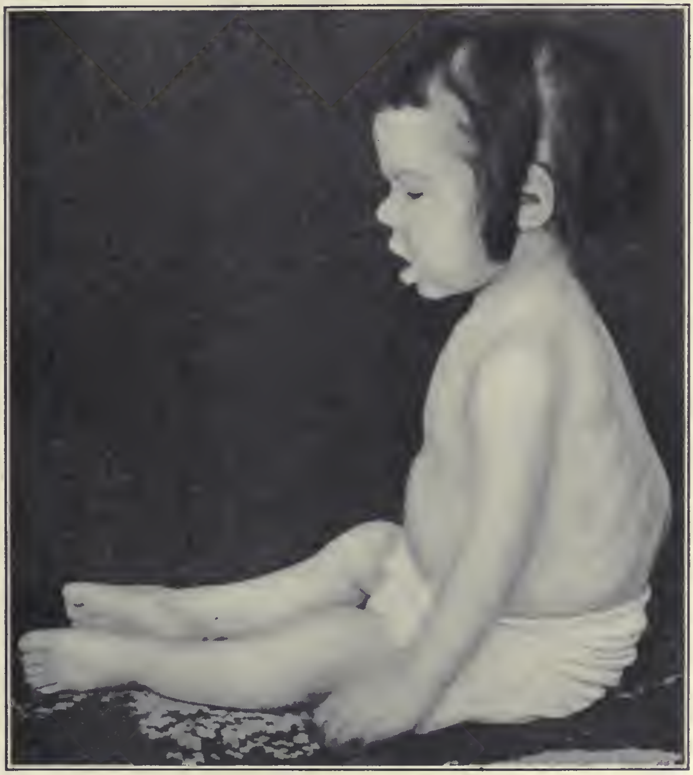
The accompanying photographs are those of a female infant, M. M., born December 15, 1903, being the twelfth child. One child (9th) died from water on the brain at the age of six months; all the other children are living and healthy. Family history is negative. Labor lasted about four hours and was normal. The child enjoyed otherwise normal health and was not seen by a medical attendant until the spring of this year. She is at present unable to articulate, although recognizing her brothers and sisters. The tongue protrudes almost constantly, with dribbling of saliva. There is incontinence of both urine and feces. She is petulant and has a violent temper.

The treatment may be said to be general and specific, the former including residence in a warm and equable climate, and the frequent employment of warm baths, such as Turkish and Russian baths. Among drugs included in the general treatment may be mentioned arsenic, strychnin, ergot and pilocarpin. In 1899 Murray, of London, reported in the *Lancet* a series of cases treated with thyroid liquid (10 m. of which represented from



SHOWING THE CHARACTERISTIC EXPRESSION, WITH THE EXCEPTION OF THE TONGUE, WHICH HAPPENED TO BE WITHDRAWN AT THE TIME THE PHOTOGRAPH WAS TAKEN.

⅛ to ¼ of the lobe of a sheep's thyroid), this single dose of 10 m. being administered once in twenty-four hours, preferably at bedtime. This preparation is now official in Great Britain. The occurrence of attacks of vertigo, syncope and dyspnea on exertion should warn the physician to exercise great care in administering the thyroid liquid, beginning with minimum doses. Murray had two deaths from syncope occurring in patients with coexisting valvular heart disease.



SHOWING THE PROMINENT ABDOMEN AND SUPRACLAVICULAR SPACES TOGETHER WITH LOWER DORSAL ANTERIOR-POSTERIOR CURVE.

In adults the powdered gland, or inspissated thyroid, is given in from 3 to 5 gr. doses three times daily. The present case has been taking ¼ gr. q. d. for the past two months, already with considerable improvement in her general appearance and her mental condition.

SUBCUTANEOUS EMPHYSEMA FOLLOWING EXPLORATORY PUNCTURE OF THE CHEST, WITH REPORT OF CASES.*

BY J. C. GITTINGS, M.D.,

Assistant Pediatric Physician to the University Hospital, etc., Philadelphia, Pa.

A sequel of pleural puncture, of which mention is rarely made, is the occurrence of subcutaneous emphysema around the point of puncture in the chest wall, and, incidentally, of pneumothorax. It is the purpose of the present article to call attention to this phenomenon.

CASE I.†—H. D., seven years old. White. Female. Admitted to the children's surgical ward of the University Hospital with a diagnosis of pneumonia and probable empyema. The surgical interne had explored the suspected area but had not obtained any fluid.

Physical Examination.—November 13th. Child lay on back or right side; any movement caused pain; respirations labored; dilation of the nasal alæ. Right chest negative except scattered coarse bronchial râles. Left chest: Area of cardiac dullness obliterated and pulsation could be felt only at the xiphoid cartilage. Extending over the entire axillary region as far down as the costal margin there was subcutaneous emphysema evidenced by crackling on the slightest pressure, and by swelling. This condition prevented satisfactory auscultation and percussion, but there were distinct bronchial breathing and bronchophony over the lower portion of the chest posteriorly. The leukocytes numbered 24,560. Diagnosis: bronchopneumonia, localized pneumothorax and subcutaneous emphysema.

By November 15th the emphysema had lessened, but the signs of pneumothorax were more decided, the percussion note being tympanitic. The general condition was distinctly worse. The examination of the blood showed: red blood cells, 5,220,000; leukocytes, 16,500; hemoglobin, 80 per cent. The sputum was rusty and tenacious but not offensive. No streptococci or tubercle bacilli were found. The urine was negative.

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* Read at the Meeting of the Philadelphia Pediatric Society, June 11, 1907.

† Case I. occurred in the service of Dr. J. P. Crozer Griffith, who has kindly placed the notes at my disposal. Cases II. and III. occurred at the Children's Hospital, in the service of Dr. D. J. Milton Miller, to whom I am indebted for permission to report them in connection with the occurrence of subcutaneous emphysema.

By November 17th the emphysema had disappeared. There was a return of the area of deep cardiac dullness and a slight pulsation was felt at the apex. The tympany was diminished except in the sixth and seventh interspaces in the axilla. Over the upper axilla and apex there were heard scattered râles and harsh breathing. In the lower axilla the breath sounds approached the cavernous in type and coarse gurgling sounds were heard on inspiration, with occasional tinkling. Posteriorly there was hyperresonance over the upper two thirds; over the lower third there was impaired resonance with gurgling and tinkling râles and slightly hollow breathing. By November 21st the tinkling sounds were fewer but were still audible posteriorly. The sputum was purulent and offensive and contained a few red blood cells and many leukocytes but no tubercle bacilli. The leukocyte count was 16,480.

By December 11th she had improved sufficiently to be taken home. At the base of the left lung signs of imperfect resolution still persisted but there were no evidences of pneumothorax. The temperature, pulse and respiration were practically normal.

CASE II.—H. B., two years old. Colored. Male. Admitted to the medical ward of the Children's Hospital on October 23, 1906, with evidences of pneumonia of the right lung, which ran an irregular course with no tendency toward a crisis or resolution. On November 14th examination showed marked dullness over the right lung anteriorly, and in the axilla, below the fourth rib. The breath sounds were faintly bronchial, the sputum foul-smelling and dirty yellow in color, containing pus cells and cocci but no tubercle bacilli. Puncture in the sixth interspace yielded a small amount of seropurulent fluid containing diplococci.

On November 19th the condition being unimproved, and abscess or gangrene being suspected, two punctures were made, one in the fourth interspace in the anterior axillary line; and the second in the eighth interspace in the posterior axillary line. No fluid was obtained at either puncture, but, with the second, air escaped through the needle and pronounced shock with frothy hemoptysis followed. With active stimulation the patient recovered from the shock in a short time.

On November 20th there was slight subcutaneous emphysema about the point of puncture, which interfered with physical examination. By November 27th the emphysema had disappeared. Another puncture in the eighth interspace in the post-axillary line gave negative results.

CASE III.—G. J., two years and three months old. Colored. Male. Admitted to the medical ward of the Children's Hospital on October 30, 1906, with a history of cough of long duration. Examination showed dullness over the left lung and fine moist râles. On November 1st puncture in the fourth interspace in the mid-axillary line gave negative results. Subcutaneous emphysema soon developed and spread over all the left chest. On November 7th the emphysema was still present but in less degree. No signs of localized pneumothorax had developed. By November 11th the emphysema had disappeared.

The causation of the subcutaneous emphysema in these cases seems to admit of only one explanation. The lung, if not adherent at the point of puncture, was rendered partially immobile by adjacent adhesions and presented an unyielding surface in close proximity to the chest wall. There being no fluid present in what was left of the pleural cavity traversed by the needle, an injury to the lung was practically sure to produce at least a localized pneumothorax, and from this along the line of puncture the development of subcutáneous emphysema would be easy provided the vis-a-tergo were sufficient.

In Cases II. and III. limiting adhesions prevented the formation of a demonstrable pneumothorax or else the pleural cavity was obliterated and the air was pumped directly into the tissues by the respiratory movements.

The only other explanation of such a condition would be an infection with an air-producing bacillus. Such an infection would scarcely have remained localized. Direct evidence that the air escaped from the lung is found in Case II.

That the tissues of the chest as well as those of any portion of the body may be subjected to extreme surgical traumatism without the infiltration of air into the areolar spaces scarcely demands mention.

On the other hand, air, under the pressure of pulmonary respiration, if it gain access to the subcutaneous tissues, will immediately begin to infiltrate them. For example, C. Pfeiffer (in *Beitrage zür Klin. Chir.*, 50, 1906, Heft. I., p. 289) records the case of a penetrating shot-wound of the chest which was followed immediately by emphysema which involved every portion of the subcutaneous tissues except those of the scalp, ears, palms of the hands and the lower extremities. In the same connection the following experience is of interest: In the removal of a pleural effusion a vacuum-flask apparatus was used, but through error the bottle was charged instead of being exhausted. In making the puncture the point of the needle was arrested on a rib and the pleural cavity was not opened. The operator, thinking that he had entered the chest, opened the cock of the bottle containing air under pressure. The result was an immediate subcutaneous emphysema of extent almost as great as in the case of penetrating wound just recounted.

In the cases of this report there were no apparent ill-effects from the emphysema *per se*, but the pneumothorax was a distinct cause of discomfort if not of actual danger. In any case for which exploratory puncture might be done the occurrence of pneumothorax might undoubtedly turn the scale against recovery.

From a theoretical standpoint, it would seem possible that air from an infected pleura entering the tissues of the chest wall might carry infection with it, but, from the lack of mention of this accident in medical literature, it may be inferred that it occurs rarely or not at all.

Attention has been called frequently to the more serious consequences of exploratory puncture of the chest. In an editorial in the *British Journal of Children's Diseases* for September, 1905, there were collected thirteen recently reported instances of death following the insertion of a needle into the chest wall, and of these thirteen seven occurred in children. In all of the cases the dangerous factor was the proximity of firm, unyielding lung tissue to the chest wall.

In view of the comparative infrequency of such accidents, the tendency is undoubtedly to regard this procedure with unwarranted confidence and not to lay sufficient stress on its dangers in our instructions to students. In the most practiced hands it is not always possible to avoid injury to the lung, but greater care in the selection of cases and in the performance of the puncture would make for the greater comfort and safety of our professional charges.

Perhaps not enough stress is usually laid upon the differences in the character of the physical signs between those produced by a collection of fluid in the pleural cavity and those produced by lung tissue, more or less solidified, which is directly adherent to the chest wall. Especially is this true in regard to the evidence to be gained by percussion.

In the case of a small collection of fluid overlying a partially or wholly consolidated area of lung, undoubtedly the signs elicited by percussion and auscultation are often insufficient for diagnosis, and the importance of determining whether or not pus is present renders puncture imperative.

It would be well to lay greater stress, however, on the fact that it is neither desirable nor necessary to insert the needle far enough to enter the lung deeply unless we are confessedly in search of an intrapulmonary collection of fluid, as in Case II. of this report, and a "dry tap" should cause at least as much chagrin to the medical operator as does the failure to find a gall-stone after cholecystotomy to our surgical confrères.

Discussion on page 72.

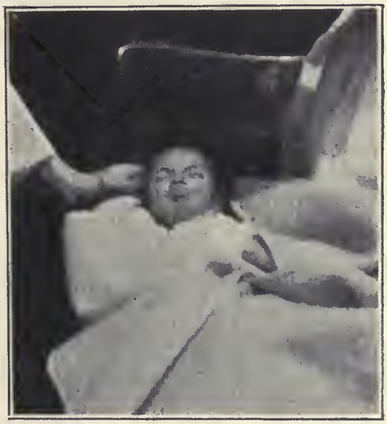
3942 Chestnut Street.

PERIODIC VOMITING WITH ACETONURIA IN CHILDREN.—Vincent Dickinson (*The British Journal of Children's Diseases*) describes the abrupt onset, the absence of previous gastrointestinal disturbance, the absence of anorexia, the absence of gastric pain, and the slight elevation of temperature, which, together with the character of the vomiting, are the most important signs to be considered in this affection which he has so carefully observed. The vomiting is produced by regurgitation, and is generally watery. The vomited matter is at first abundant, but diminishes by degrees. The attacks occur several times a day, either spontaneously or excited by movement. During the attack the breath has a distinct smell of acetone. The urine is scanty, and analysis shows a definite amount of acetone, and also often of indican. These attacks occur in the midst of perfect health in a child who is usually of a nervous or arthritic diathesis. The prognosis is almost always favorable. Different authorities advocate different methods of treatment, the only specific one founded on a conception of the pathology of the condition being that of Edsall. He considers it due to an acid intoxication, and gives a diffusible alkali, such as bicarbonate of sodium, in large doses.—*Medical Record.*

TETANUS NEONATORUM COMPLICATED BY PNEUMONIA.*

BY RALPH OAKLEY CLOCK, M.D.,
Chief Resident Physician at St. Christopher's Hospital for Children, Philadelphia.

Of all the diseases of infancy, none is more fatal than tetanus. The proportion of fatal cases is probably 95 per cent. Baginsky lost all of his cases, Holt has witnessed a single recovery, and recoveries have been reported by Monti, Escherich, and Soltman. I am indebted to Dr. M. P. Boyle for the privilege of reporting this case, in which such marked improvement followed treatment that strong hopes were entertained for the patient's recovery.


TETANUS NEONATORUM.
Showing wrinkled brow, tightly closed eyes, and "flute position" of lips.

CASE.—P. B., girl, aged seventeen days, was admitted to St. Christopher's Hospital on April 16, 1907. Birth had been normal and the infant breast-fed. The present illness began five days before admission, when it was noticed that the infant eagerly seized the nipple, but soon dropped it and cried. The next day, swallowing was difficult and the infant was unable to nurse. The lower jaw was at first dropped, but at times became tightly locked, the mouth being almost entirely closed. Several times, too, during the day, the mother noticed that there were general muscular twitchings and the body for a moment became rigid. During the interval between these attacks the muscles were completely relaxed. The paroxysms soon increased in frequency and there was then only partial relaxation. Soon the body became rigidly arched and the extremities stiff. This condition prevailed until admission. Swallowing had been very difficult—only a small quantity of barley water having been taken from a dropper—and during the two days previous to admission no food had been given. There had been marked constipation for three days.

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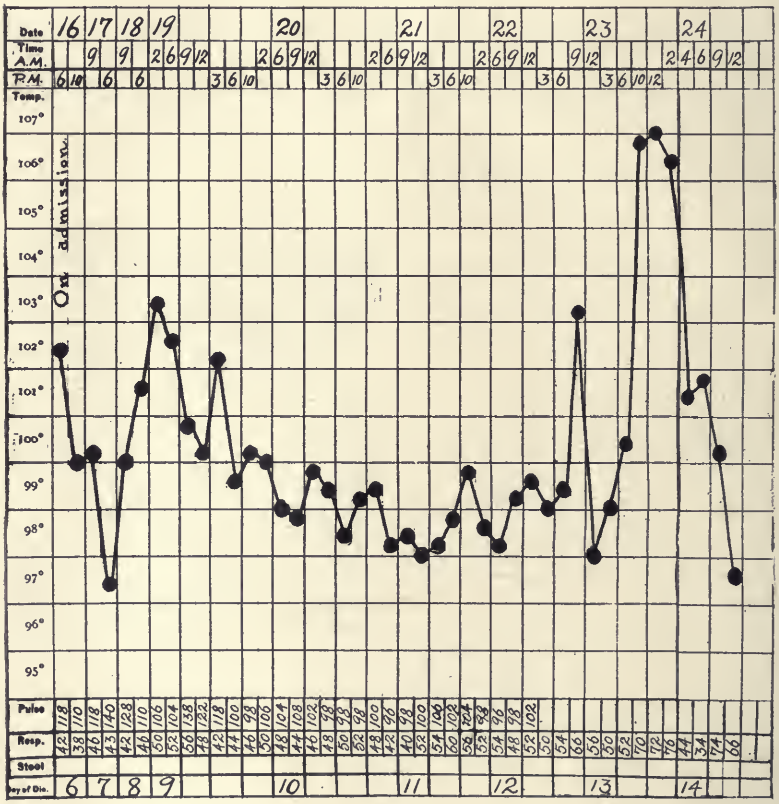
* Read by invitation before the Philadelphia Pediatric Society, June 11, 1907.

Examination.—The limbs were rigidly extended—fists were clenched with thumbs folded over fingers; feet were rigidly flexed in position of talipes calcaneus, and the toes were flexed on the plantar surface. There was no motion possible at either knee or ankle. Lymphatic glands were not palpable; nutrition and development were good, and there was no rachitic tendency. Head presented no abnormalities; the anterior fontanel was soft and even. Eyes were tightly closed; pupils were equally contracted, but reacted to light. Forehead was wrinkled. Lips were cyanotic and tightly closed; the upper lip was puckered, forming



the typical position of playing the flute, as shown in the accompanying photograph. Jaws were rigidly locked and neck was rigid with head retracted. Spine was rigid and arched in opisthotonus. Lungs and heart were negative. Liver was not enlarged and spleen not palpable. Abdomen was slightly distended and tympanitic. Umbilicus was unhealed and bleeding, with granulation tissue at the base. The abdominal walls for a distance of one inch about the umbilicus were inflamed and edematous, and very prominent. There was frequent twitching of the orbicularis oris muscle. All reflexes were absent on account of the marked general rigidity. Chvostek's sign and Trousseau's phenomena were absent.

The infant was fed on a whey mixture by means of a catheter introduced through the nose. Chloral and Calabar bean were administered and the wound treated antiseptically.

April 19th.—Three days later the trismus had decreased to such an extent that the infant could swallow feedings given through a pipette. The feedings had, for the most part, been rejected. Wine whey was substituted for the whey mixture. The "flute position" of the lips was now not present. Arms were still rigid and fists tightly clenched. Legs showed some relaxation; knee joints were movable, and there was some limited motion at the ankles. There were five convulsions at intervals of two hours, lasting about a minute. During these convulsive seizures of the muscles, the limbs, which were in a condition of tonic spasm, became overextended; the lips became puckered, the jaws rigid; the facial muscles contracted; the mouth and the face cyanotic; and, when the convulsion passed off, pallor supervened. Urinalysis showed the presence of albumin. On this day, also, a profuse vaginal discharge appeared. The temperature during these three days was irregular. Once during the day, and once on the preceding day, the infant gave vent to a cry, sharp and shrill, high-pitched, but not loud.

April 20th.—All food was retained. Chloral and Calabar were stopped and bromids substituted. There was marked epigastric distention, and the infant spat up a small amount of bloody mucus. Lips were cyanosed; pulse was weak and at times not palpable. The muscles of the extremities remained in a state of tonic spasm. Between 7 A.M. and 9 A.M. there were three short convulsions.

April 21st.—Bloody mucus was again spat up and the abdomen was distended. The limbs were quite relaxed. The mother was induced to come to the hospital three times daily to nurse the baby, and the breast feedings were retained. The artificial feedings were now given in a bottle which the infant readily took, and all food was retained. The temperature now registered 98° F. The pulse-rate had remained about 100, but at times was very weak and almost imperceptible. Respirations had ranged between 45 and 55, but now dropped to 40. The general condition was much improved, and it seemed likely that recovery would follow.

April 22nd.—The patient's condition remained about the same; the only unfavorable sign was an increase in the respirations, 60 to the minute.

April 23rd.—Infant refused the breast and took only half of the bottle feedings. The latter were now changed to a peptonized weak milk formula, which was readily taken and retained. The abdominal distention had now disappeared. There were considerable cyanosis and marked dyspnea, with rapid grunting respirations, the rate now being 66. Pulse became very weak and finally could not be palpated, and the temperature rose to 103° F. Examination of the lungs was negative. During the forenoon the temperature dropped to 98° F., but toward midnight it went up to 107° F. Respirations became 72 to the minute, labored and of the "cog-wheel" type. The pulse was imperceptible. There was no retraction of the head, and the abdomen was not distended.

April 24th.—Infant's condition seemed improved. Temperature 101.4° F. and respirations 34. There was still no palpable pulse. Examination showed impaired resonance at the right base, posteriorly, with a rude respiratory sound. No râles were present. Temperature continued to fall and at noon registered 97.6° F. Respirations, on the other hand, were 66 to the minute. The early morning feedings were regurgitated, while those given during the forenoon—including the mother's feeding—were refused. At noon a small quantity of bright yellow fluid was vomited, and the abdomen was greatly distended. The lower jaw dropped and deglutition became impossible. The skin became pale and cold, and in spite of stimulation the infant succumbed at 2:30 P.M. The stools consisted each day of green mucus, and averaged three daily.

April 25th.—Postmortem examination showed the following:

Lungs.—Some consolidation of right lower lobe and parts of both upper lobes.

Heart, liver, spleen, and kidneys showed no abnormalities. Stomach was distended and empty; the gastric mucosa was quite hyperemic. Intestines were slightly distended, the mucosa being swollen, but there was no evidence of follicular involvement. The peritoneum was smooth and not congested, and without exudate. Umbilical wound was almost entirely healed and showed little evidence of the septic process.

The diagnosis of tetanus in this case was based on the following facts:

1. Sudden onset of symptoms in a newborn infant.
2. Presence of an infected wound.
3. Marked febrile disturbance, associated with gastro-intestinal symptoms.
4. Persistence of trismus and of tonic spasms of muscles of the trunk and extremities.
5. Exclusion of tetany and strychnin poisoning.

Tetany was excluded because the case only bore a superficial resemblance to that disease. Tetany is not frequent in America—Holt states that he sees but four or five cases yearly. On the other hand, Hartigan estimates an annual mortality in tetanus neonatorum of 25,000 in this country. In the majority of cases, tetany is associated with laryngismus stridulus; and involvement of the face and trunk muscles is rare, so that opisthotonus is uncommon. The muscles of the upper extremities are first affected, the spasms becoming more severe and involving the lower extremities. Moreover, the hands assume the "obstetrical position," or take the position of "driving horses." The feet are extended in equino-varus, and motion at the hip and knee is generally free. Trousseau's symptom and Chvostek's sign are present, and the reflexes—deep and superficial—are exaggerated. There is an absence of fever in tetany. The temperature in tetanus is decidedly elevated. This is chiefly due to disturbance of heat regulation. Wunderlich reported a case of tetanus where there was a preagonal temperature of 112.5° F., and Lehmann records a temperature of 111.9° F. Trismus—the first and most striking symptom of tetanus—is extremely rare in tetany.

Strychnin poisoning is first shown by gastric irritation.

Spasms occur at once and are intense from the start, affecting first the muscles of the extremities. There are intervals of absolute relaxation during which the mouth can be opened. This condition quickly ends by death or recovery; whereas tetanus may be protracted to three weeks. Opisthotonus occurs early in strychnin poisoning, and there is an absence of any wound.

SUMMARY AND CONCLUSIONS.

(1) The first symptoms of the disease in this case appeared on the 12th day of life. As a rule, the onset is from the 3rd to the 12th day, but rarely later.

(2) Antitoxin was not available at the time of admission, so there was no opportunity of carrying out that line of treatment.

(3) The convulsions were general, and only eight of them were observed after admission.

(4) Trismus was continuous until 70 grains of chloral had been administered, which produced relaxation on the 4th day of the patient's stay in the hospital.

(5) Vomiting, which had been so persistent during the first three days after admission, stopped entirely for a time, and subsequently was infrequent.

(6) The secretion from the wound was mainly serous, but at times was blood-stained.

(7) The characteristic cry was heard only on the second and third days after admission; at all other times the infant rested quietly.

(8) The vaginal discharge was an evidence of the general septic infection.

(9) The termination of the disease with pneumonia was probably due to a secondary infection. It may have been an aspiration pneumonia, owing to the frequent vomiting.

(10) The decreasing frequency of the clonic exacerbations, and the relaxation of the trismus, showed that the disease was abating. Then, too, the fact that the umbilical wound was practically healed, also tended to show that the infection had subsided. It seems fair to assume, therefore, that but for the pulmonary complication the termination would have been favorable instead of fatal.

2600 Lawrence Street.

AN EXAMINATION OF EXCISED TONSILS. A CASE OF TUBERCULOUS INFECTION BY A BACILLUS OF THE BOVINE TYPE.

BY ALFRED F. HESS,
New York.

The question of the importance and frequency of tuberculosis of the tonsil has been answered by various writers in varying ways. Those who believe that the lungs constitute the chief portal of entry for the tubercle bacillus, regard the implication of the tonsil as exceptional, whereas others, the followers of von Behring, insist that this portion of the alimentary tract is frequently the site of invasion. A consideration of clinical, pathological and bacteriological reports does not aid in bringing about greater unanimity. For, although clinicians are agreed in pronouncing tuberculosis of the tonsils rare, pathologists have differed greatly in the number of instances in which they have found tuberculosis. This variance is due partly to the fact that some give postmortem reports, whereas others detail the results of the examination of tonsils excised during life. It is fairly well agreed that many patients suffering from advanced tuberculosis develop a secondary tuberculous infection of the tonsils.[1] However, there is a surprising difference of opinion as to the incidence of tuberculosis in tonsils obtained during life; some find no tuberculosis in an examination of hypertrophied tonsils,[2] others, examining no more carefully, record a considerable percentage.[3] Nevertheless, so much careful investigation has been granted this subject that I should not have written this paper were it merely to record the results of the examination of a further number of excised tonsils. This work was done while employed in isolating and differentiating tubercle bacilli obtained from other sources, which will be reported on elsewhere. During the course of the winter of 1906 the material was obtained in the routine of dispensary practice, and as 1 case proved especially interesting, lending itself to a thorough clinical and bacteriological examination, it seemed worthy of record.

After excision each tonsil was washed and taken in water to the laboratory. There it was thoroughly rinsed in running water, then put into two changes of distilled water and well shaken. Finally it was poured into a sterile petri dish and a piece removed with sterile instruments for subcutaneous inoculation into a guinea-pig. The remainder was placed into a 10 per cent. formalin solution, and later into alcohol for sectioning. The pigs used were of moderate weight, were examined once a week for the presence of enlarged lymph nodes, and killed in six to eight weeks if they showed no signs of disease.

Altogether twenty-five tonsils and five adenoids from 13 children were examined. The children were apparently healthy, many of them had enlarged cervical lymph nodes, a few gave a history of recent tonsillitis. None had a family or past history suggesting tuberculosis. Of the twenty-five tonsils, one proved tuberculous. Nineteen were examined microscopically; all were inoculated into guinea-pigs. Of the five adenoids, none proved tuberculous; of these, four were examined microscopically, and all were tested on guinea-pigs.

The tonsil from which the positive animal inoculation resulted was obtained from a patient at the Babies' Hospital Dispensary, in the service of Dr. Van Ingen, whom I have to thank for the case and for much of the material. Her history is as follows:—

Helen F., six years old, first seen at the dispensary March 13th. Her family history was negative. When two and a half years old she had measles and but lately had recovered from pertussis, which in turn was followed by tonsillitis. She now complained of feeling weak.

The girl was a pale, thin child, weighing 40 pounds, with a poorly developed, narrow chest. Examination disclosed no changes in her heart or lungs. Hypertrophy of the tonsils, slight enlargement of the cervical lymph nodes, as well as adenoids of moderate size, were present. Two days later the tonsils and adenoids were removed under ether narcosis and she made an uneventful recovery, the tonsils healing quickly.

On March 15th, the day of the operation, the two tonsils and the adenoids were inoculated subcutaneously into three guinea-pigs—No. 426, No. 427, No. 428. Care was taken, as above described, to prevent surface contamination of the tissue. The pigs were kept together in a cage, apart from others.

Pig No. 428, a very small animal, weighing 130 grams, into which adenoid tissue was inoculated, died three days after inoculation from unknown cause. On April 3d an examination of pig No. 426, which had been inoculated with tonsillar tissue, showed a superficial abdominal ulcer and enlarged inguinal lymph nodes. It was chloroformed. The autopsy showed enlargement of the inguinal lymph nodes, miliary tuberculosis and marked enlargement of the spleen; also miliary tuberculosis of the lungs with enlargement of the bronchial lymph nodes. Tubercle bacilli were obtained in smears from the ulcer of the abdominal wall and from the lung. Tissue for culture on dog serum was taken from the inguinal, mesenteric and bronchial lymph nodes, and spleen. Pig No. 427 was chloroformed one week later, but no evidence of tuberculosis was found and all cultures proved negative.

Cultivation of the bacilli was attended with difficulties. In spite of various manipulations to stimulate growth, no colonies appeared for thirty days. The colonies appeared as small, flat, grayish pellicles, first seen in the spleen culture, and then in that containing tissue from the inguinal lymph nodes. Transfers to fresh dog serum were made, with the result that, although some cultures died off, in two tubes a stronger growth was obtained. The bacilli, when stained with carbol fuchsin and decolorized with 10 per cent. nitric acid and 95 per cent. alcohol, appeared as small rods 1 to 1.5 μ in length, for the most part straight and of uniform appearance.

On June 1st two guinea-pigs were inoculated intra-abdominally and two rabbits intravenously with 0.5 c.c. of this culture. A twenty-two-days-old serum culture of the second generation was employed. The emulsion injected was made in salt solution and equalled in density a twenty-four-hour typhoid bouillon culture. The pigs died on the eighteenth and the twenty-second day, respectively, and showed a marked, general tuberculosis. One of the rabbits was found dead on the sixteenth, the other on the twenty-fifth day. Autopsy showed in both cases advanced tuberculosis, the lungs being so thickly studded with tubercles that they did not collapse upon opening the thorax.

That a differentiation between the human and bovine types can be made, following the rules laid down by Theobald Smith, is now generally agreed upon by bacteriologists of all countries. I shall not detail the method of differentiation here. In this case, the short, straight form of the bacillus, its slow growth and difficulty of cultivation, its pathogenicity for guinea-pigs, and, above all, its marked pathogenicity for rabbits, all serve to place it in the bovine group.

As was mentioned above, nineteen tonsils were examined microscopically. Numerous sections were made, but tuberculous lesions were not found in any case. In the case just reported, in which animal inoculation incited tuberculosis, over a hundred sections were examined without avail. Others have reported similar results. In Allen Macfadyen's and Macconkey's[2] investigation of mesenteric lymph nodes, these authors were able to demonstrate tuberculosis by inoculation in 7 cases in which it could not be discovered by microscopical examination. Harbitz,[4] Weichselbaum and Bartel[5] have also reported on this fact. More recently, Weber and Baginsky[6] have reported the isolation of a tubercle bacillus of the bovine type in a lymph node which showed no microscopical evidence of tuberculosis.

At intervals of weeks and months I examined the chest of the child whose tonsil was proved to be tuberculous, but was unable to find definite signs of disease. On April 23d Dr. Lewis Cole made a radiograph of the chest and reported as follows: "Well-defined infiltration of tuberculous character around the roots of the lungs, more marked on right side."

No sputum could be obtained from which to make spreads or to attempt a culture for comparison with the strain isolated from the tonsil.

On May 27th I gave the patient an injection of 1 mg. of tuberculin, having recorded her temperature for the two days preceding. There was no reaction. It was impossible for some time to repeat the test with a larger dose of tuberculin, firstly, owing to the fact that she contracted varicella, and later, because, although feeling perfectly well, she ran a temperature of 100° to 101° F. at some time every day. In the beginning of September I again saw her. Since June, the date of my last examination, she had been well, although she looked thin and delicate. Her temperature, when taken as before, every three hours for two days, ranged between 99° and 99.6° F. On September 10th I injected 3 mg. of tuberculin in the interscapular space. The reaction was positive; the temperature rose to 102.6° F. on the following day and was accompanied by a general malaise. I have seen the child once since then. There is no change, either in her appearance or in her physical condition. She still continues to run a slight temperature.

The number of cases in which tubercle bacilli have been obtained from a tonsil and cultivated and differentiated are very few. The only instances of which I know are the 3 cases lately reported by Brown.[7] In all of these the bacillus was of the bovine type. In the case of a child of five years, the general condition was unchanged four months following the removal of the tonsil, and in another case a child two years of age was reported as doing well three years after the operation. The child of which I write has done well also.

In reviewing this case, let me add that I believe that the tonsil was infected by means of tuberculous food, and that the infection was of recent origin. For had it existed for a long time, a period of some years, it is hardly conceivable that bacilli of such marked virulence would not have wrought greater destruction. An infection of this nature, where tuberculosis is demonstrable only by means of the microscope or by animal inoculation, may more properly be called an *occult* tuberculosis, thus leaving the term "latent tuberculosis" for such tuberculous conditions as produce no symptoms, and cannot be disclosed by the clinician, but reveal themselves only at autopsy as healed lesions. Finally, I consider that the involvement of the bronchial glands in this case did not follow along the lymphatic channels from the tonsil, but that it was rather the result of an independent infection, possibly with bacilli of the human variety. For, even granting that the bronchial glands may be infected by way of the cervical lymphatics, which we have some reason to doubt,[8] this path in my case seems unlikely, as we can hardly believe that, had the disease followed this course, the cervical lymph glands would have been spared.

154 West Seventy-second Street.

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EPIDEMIC ANTERIOR POLIOMYELITIS IN PHILADELPHIA, WITH AN ANALYSIS OF CASES OCCURRING IN THE PAST FOUR AND A QUARTER YEARS AT THE CHILDREN'S HOSPITAL.*

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In the performance of the duties of registrar at the Children's Hospital of Philadelphia, it became evident that a large number of cases of acute anterior poliomyelitis had been treated in the dispensaries between the dates of July 23 and October 24, 1907. Knowing that the disease was considered as epidemic in New York City and in the western part of Pennsylvania, the following statistics have been compiled from the histories of that hospital.

The card index of the hospital now in use was inaugurated July 1, 1903, which gives a period of four and a quarter years to work in. The cases have been carefully selected; all doubtful ones have been excluded. In many respects the dispensary histories are lacking in essential details, but much valuable information has been obtained.

Cases of Poliomyelitis Treated Since July 1, 1903, at the Children's Hospital.

DATE.	DURATION.	DATE.	DURATION.
1903		**1903**	
7.22	2 days	9.2	1 day
7.27	2 weeks	10.20	1½ months
8.1	——	11.11	5 "
1904		**1904**	
5.4	9 months	9.21	4 days
5.17	1 year	11.28	——
6.20	11 months	12.10	5 months
8.23	1 day		
1905		**1905**	
1.29	6 days	7.13	2 days
1.31	16 months	7.22	2¼ years
5.15	7 "	8.21	10 weeks
1906		**1906**	
4.11	3 days	8.22	22 days
7.23	3 weeks	11.19	——

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* Read before the Philadelphia Pediatric Society, November 12, 1907.

1907—Cases not included in Epidemic.

1.7	3	weeks	8.8	3	years
1.23	1	week	9.17	3¾	“
7.24	2	years	9.18	9	months
8.3	6	“	10.14	2	years

1907—Epidemic.

7.23	½	day	9.13	1	day
8.7	2	weeks	9.13	2	weeks
8.12	3	days	9.14	2	“
8.22	2	“	9.17	4	days
8.27	2	weeks	9.24	3	“
8.29	1	day	10.5	1	day
9.6	4	days	10.21	2	weeks
9:7	5	“	10.24	4	“
9.7	10	“	10.24	9	days

Receiving Ward Cases.

8.30	9.19
8.31	10.10
9.15	10.18

Cases under one month's duration on admission (not including receiving ward):
July 1, 1903, to July 1, 1907 (4 years), 12.
July 23, 1907, to Oct. 24, 1907 (3 months), 18.

The receiving-ward cases are given to show the prevalence of the disease, but are not included in the following totals:—

During the last six months of 1903, 6 cases of the disease were treated, 3 of which were of less than a month's duration on admission.

In 1904, 7 cases were treated, 2 of which were of less than a month's duration on admission.

In 1905, 6 cases were treated, 2 of which were of less than a month's duration on admission.

In 1906, 4 cases were treated, 3 of which were of less than a month's duration on admission.

In 1907, 8 cases have been treated that do not enter into the question of the epidemic. There were 2 cases in January of less than a month's duration on admission, but the remaining 6 cases were all from nine months' to six years' standing on admission. From the records of the preceding years this seems to be about the normal quota for 1907.

This makes a total of 12 cases treated in four years of less than a month's duration on admission.

From July 23, 1907, until October 24, 1907, 18 cases were treated of less than a month's duration on admission, or 50 per cent. more than the sum of all the cases in the preceding four years.

In addition 6 cases applied at the receiving ward for admission to the hospital, but as they were referred to other institutions they are not included in the totals.

The number of cases treated in the hospital for the three months between July 23 and October 24, 1907, including the cases of long-standing disability on admission, brings the number to 24, or only 1 less than the total (25) for the four preceding years.

Under these circumstances it seems that the disease is epidemic in Philadelphia, as this array of facts could hardly be attributed to coincidence. If the other hospitals would search their records they would probably find confirmatory evidence.

ANALYSIS OF FORTY-THREE CASES.

SYMPTOMS.	Previous to Epidemic.	Epidemic.	Total.
Fever	15	7	22
Vomiting	14	2	16
Paralysis (first symptom)	6	8	14
Diarrhea	1	3	4
Cough	3		3
Restlessness	1	1	2
Stupor	2		2
Coldness (paralyzed part)	2		2
Chills	1		1
Convulsions		1	1
Swollen face	1		1
Rash	1		1
Rigidity of neck	1		1
Kernig's sign	1		1
Tache	1		1
PAIN.			
Legs	3	2	5
Undetermined	4		4
Over spine		1	1
Knee	1		1

COMPLICATIONS.

Pneumonia	1	Measles	1	Bronchitis (severe)	1
Rickets	1	Pertussis	1		

SEQUELÆ.

Enuresis	1

Time of Onset of Paralysis.

TIME.	Previous to Epidemic.	Epidemic.	Total.
First symptom	6	8	14
8 hours after initial symptom	2		2
12 “ “ “ “	2		2
24 “ “ “ “	2		2
7th day “ “ “	2	2	4
3d “ “ “ “	3		3
4th “ “ “ “	1	2	3
5th “ “ “ “	1	1	2
6th “ “ “ “		1	1
2d “ “ “ “		1	1
Found at end of week's illness	4	2	6
3d day — head and neck; 6th day—legs	1		1
6th day—right arm; 21st day—left leg		1	1
Not mentioned	1		1
Total	25	18	43

Parts Paralyzed.

PART.	Previous to Epidemic.	Epidemic.	Total.
Both legs	11	4	15
Left leg	3	5	8
Right arm and right leg	3	2	5
Right leg	2	1	3
Right arm		2	2
Left arm	1	1	2
Right arm and left leg		1	1
Left arm and right leg	1		1
Left thigh		1	1
Both legs, head, neck, arms	1		1
Both legs, abdominal muscles	1		1
Both legs, head and back	1		1
All extremities except right arm	1		1
Not mentioned		1	1
Total	25	18	43

RESULT.

Improved.	Much Improved.	Not Improved.	No Second Visit.
14	10	4	15

TIME OF FIRST IMPROVEMENT.

1st week.	2d week.	4th week.	2d month.	Not recorded.
9	5	1	1	23

Upon analyzing 43 cases (which number represents the histories in which there were sufficient notes to gain information) occurring during the past four and a quarter years, the following statistics have been obtained:—

The majority (50 per cent.) of the cases started with fever and vomiting (30 per cent.) often accompanied by one of the other symptoms noted. In approximately 32½ per cent. of the cases the paralysis was the first symptom discovered. The other symptoms noted might occur in any infectious disease.

One case previous to the epidemic showed symptoms of accompanying meningitis (Dr. J. P. Crozer Griffith's case).

The paralysis appeared in over half the cases (22) during the first twenty-four hours. If the cases reported as being paralyzed on the seventh day are considered as having been overlooked until that time, which is probable, as in each instance the child was ill enough to be in bed, and as those cases reported as not having been discovered until the child got up from some illness at the end of a week seem to bear out this assumption, the time of the onset of the paralysis gradually diminishes during the first week. No cases are reported where the paralysis occurred later than the seventh day, except in one instance, where a second extremity became paralyzed fifteen days after the first seizure.

Two cases of this secondary paralysis are noted, one in which the muscles of the head and neck were involved on the third day and both legs on the sixth day. This case occurred on January 7, 1907, before the epidemic. The other case developed during the epidemic. In this the right arm was paralyzed on the sixth day and the left leg on the twenty-first day (author's case).

The paralysis involved a single extremity in the majority of the cases (approximately 38¼ per cent.). Paralysis of both legs occurred nearly as often in 32½ per cent. of the cases. Paralysis involving widely separated groups of muscles occurred in 25¼ per cent. of the cases.

An arm on one side and a leg on the other were paralyzed in 2 instances. The muscles of the head in 2 and the abdominal muscles in 1 (Dr. J. P. Crozer Griffith's case).

Pain was noted in 11 cases, or one-fourth of those studied. Four cases were discovered when the children arose from severe illnesses, namely, pneumonia, measles, pertussis, and a severe attack of bronchitis. One case occurred in a rachitic child. Enuresis developed immediately after the onset of the paralysis in 1 case. No Babinski or ankle clonus was reported; the knee jerks were lost in all cases where the lower limbs were involved.

The time when the improvement was first noted was most often in the first and second weeks. In 1 case it was not noticed until the fourth week, and in another not until the second month.

The final results where obtained show a marked improvement in a majority of the cases. Only 4 out of 27 cases recorded show no change in the extent of the paralysis in periods varying from six months to six years. The length of time over which the period of improvement extends varies. One child could not walk at all for two weeks and in two months was practically well (Dr. Herbert Carpenter's case). Another did not walk for two years, and then regained partial use of the limbs for walking. Where improvement was noted it was usually gradual. However, in 1 case the right leg had entirely recovered in two days, although the arm was permanently disabled.

In analyzing the 18 cases of less than a month's duration upon admission, occurring between July 23 and October 24, 1907, and separately comparing them to the remaining 25, no deviation from the above records was found. Here the discovery of the paralysis as the first symptom was in slight excess to the initial fever and vomiting. The paralysis appeared most often during the first twenty-four hours, as in the previous cases, and the involvement of a single extremity was the most frequent form of paralysis, closely seconded by disability of both lower extremities. Pain was noted in about the same proportion of cases. Meningeal symptoms were lacking. The improvement in the cases seemed about the same as in the other 25. The distribution of the cases showed that they occurred in all parts of the city from which the hospital draws. Two cases occurring in the same house were not seen, but a second case developed in a house where the back yard joins a property in which a case had developed three weeks before. While the distribution was general over the southern part of the city and in West Philadelphia, an area of ten blocks square, bounded by Seventeenth Street, Twenty-seventh Street, Lombard Street and Dickinson Street, furnished three-quarters of the cases treated during the epidemic.

No cases have been treated in the hospital since October 24th.

Dr. Herbert Carpenter, in whose dispensary the majority of the cases were treated, confirms the statistics on the point that the disease as it appeared during the epidemic did not differ from the ordinary sporadic cases of acute anterior poliomyelitis.

Conclusions.—(1) There has been an epidemic of acute anterior poliomyelitis in Philadelphia. (2) The disease must be infectious. (3) Cases seen at the Children's Hospital did not differ from the ordinary sporadic acute anterior poliomyelitis. (4) No accompanying meningitis was seen during the epidemic, although one of the former cases showed the symptoms. (5) Two cases were not reported from the same house, but 2 from the immediate neighborhood, and three-quarters of the cases during the epidemic came from an area of ten blocks square. (6) Three weeks elapsed before the onset of the second case of 2 reported from adjoining houses. (7) Physicians should aid the state and city authorities to discover the cause of the disease by placing at their disposal all cases, where it is possible, so that clinical and bacteriological examinations of the cerebrospinal fluid, discharges from ears, etc., can be made. (8) Other hospitals should compile statistics covering this period.

I am greatly indebted to Drs. J. P. Crozer Griffith, J. Madison Taylor, Herbert Carpenter, Charles H. Weber, Arthur Newlin, Alexander Davisson and Astley P. C. Ashhurst for their permission to use the histories selected for this article, as they were first recorded during their terms of service at the Children's Hospital.

THE AXILLARY REGIONS are recommended by Klose (*Deutsche medizinische Wochenschrift*) as being the best situation in which to inject antitoxin or similar preparations, as the skin is freely movable, is well padded with fat and connective tissue, and the lymphatics are well developed.—*Medical Record.*

THE INDICATIONS FOR AND AGAINST REMOVING ADENOIDS, AND METHOD OF OPERATING.*

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By adenoids, we mean an overgrowth of the glandular tissue in the nasopharynx. What constitutes a normal pharyngeal tonsil is hard to say. A mass large enough to obstruct some noses would give no symptoms in another; but the term "adenoids" is taken to mean a pathological condition, and the question of getting rid of a pathological condition that is doing injury is what we have to answer this evening. As this is a meeting of pediatrists, we shall limit our paper to the consideration of adenoids in children, in whom, of course, they are most common.

The indications for their removal are based on the symptoms they give. I know of no better classification of these symptoms than that given by Parker, of London, with a few modifications, as follows:—

INDICATIONS FOR REMOVAL.

1. Nasal obstruction, causing:—
    - (*a*) Broken sleep, struggling for breath, nightmare.
    - (*b*) Anemia and general debility.
    - (*c*) Malnutrition and stunted growth.
    - (*d*) Headaches and poor memory.
    - (*e*) Snoring.
    - (*f*) Enuresis.
    - (The above when the child tries to breathe through the nose.)
2. Mouth-breathing with the attendant chronic pharyngitis, laryngitis, bronchitis and croup.
3. The presence of adenoids, causing:—
    - (*a*) Thick speech of nasal quality.
    - (*b*) Inability of infants to suck.
    - (*c*) Frequent colds or a chronically running nose.
    - (*d*) Deafness.
    - (*e*) Gastric disturbances from swallowing nasal discharge.
    - (*f*) Epistaxis.
    - (*g*) Anosmia.

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* Read at the New York Academy of Medicine, Section on Pediatrics, June 11, 1907.

4. Reflex conditions sometimes due to the presence of adenoids.

    (*a*) Asthma.
    (*b*) Hay fever.
    (*c*) Stammering.
    (*d*) Epilepsy.

The *first* and *great* indication for removing adenoids is that they cause nasal obstruction. As has been wisely said: "It is as unphysiological to breathe through the mouth as to eat and drink through the nose." A small infant will struggle and fret when nursing when even a small string of ropy mucus is lodged in one naris. When there is a postnasal obstruction, the infant has to stop nursing to get its breath, swallows air and is generally disturbed. This leads to malnutrition very early in life. I have removed good-sized masses from infants under two months old with immediate relief from this inability to nurse satisfactorily. I remember one negro woman who asked me if her baby could nurse immediately after the operation; and she said later that it was the first meal that her child had really taken normally, and that it went off to sleep the picture of comfort.

A child with nasal obstruction will soon begin to sleep with its mouth open and may in this way sleep fairly well, especially when there are no enlarged tonsils to stop up its throat. But even so, the normal way is often persisted in, and then it is that not enough sleep of the quiet, normal kind can be had. Besides the injury done to the upper air passages by mouth-breathing, there is the compression of the face, drooping of the jaw, sunken chest and stupid expression of the *persistent* mouth-breather. The child goes to bed stupid and wakes up pale and languid—the antithesis of the normal healthy child.

A *second* indication is a chronic nasal catarrh, or running nose, which may be attended with frequent nose-bleeds. Every child should be taught to blow its nose as part of the regular morning toilet. If it cannot do this, something is the matter, and the most common condition in cases of this kind is postnasal obstruction due to adenoids. I do not mean here the acute colds, but a chronically running nose. This condition is often associated with a hacking cough, as though the child was clearing its throat. A very disagreeable habit may be formed right along this line.

A *third* indication is stuffy speech. Not so much the dampened tones due to enlarged tonsils, but speech lacking nasal resonance. "Common" is pronounced "cobbod"; "nose," "doze," and "song," "sogg." Many cases also of delayed learning to talk and talking so that only the mother can understand what the child is saying are relieved by removing the adenoids.

A *fourth* indication is a narrowing of the upper jaw and irregular crowding of the teeth. From a given permanent incisor or molar, a dental arch curve can be mathematically plotted, and this curve is *always* a well-rounded one in front. The high, narrow arch is abnormal and often seen in idiots. Secondarily, in these cases, we often find deviated nasal septa.

A *fifth* indication is deafness due to o. m. c. c. (chronic catarrhal otitis media), or to o. m. p. c. (chronic purulent otitis media). Children are sometimes accused of being inattentive in school when the real trouble is beginning deafness due to blocking of the eustachian orifices by masses of adenoid tissue. There is normally a small gland, called the tubal tonsil, situated just behind and above the posterior lip of the eustachian orifice. This on each side may be a lateral extension of a larger central mass or may be independently enlarged. In either case a blocking of the orifice results and lack of proper ventilation of the middle ear.

A *sixth* indication is hypertrophic rhinitis, especially of the inferior turbinate bodies, which then form an anterior obstruction, which, if allowed to go on for months, will leave a nose still obstructed after the adenoids have been removed. Such a result is due to delay, and is one cause of failure of the operation to give that relief which has probably been promised to the parents.

A *seventh* indication may be classed under the reflex disturbances—enuresis, asthma, hay fever and epilepsy. Even if the adenoids in a given case do not seem to be large enough to cause any local symptoms, the physician may have sought in vain for some cause of one of the above lesions in his nervous child, and, as a last resort, decided that it might be well to have its adenoids removed. A large number of cases are on record as much improved or cured by this procedure.

The foregoing are some of the indications given us by the subjective and objective symptoms without having ascertained definitely that adenoids exist. It is always necessary to make an examination of the nasopharynx to get a correct idea of the size, extent and character of the growth suspected. In children under seven, a postnasal mirror can rarely be used. In older children and adults, the mirror is the best means of making out the character of the lesion; but it must be remembered that a mass in the nasopharynx will appear smaller in the vertical diameter than it really is, because of the angle of vision. In the cases where it is impossible or unsatisfactory to use the mirror, palpation with the finger must be done. This is not an agreeable ordeal for the patient, especially if the space is small and the physician's finger large; but the examination should nevertheless be made and sufficient time taken to be sure of what is felt. If the child's head is held against the left side and its hands intrusted to an assistant, the examiner may push his left thumb against the child's left cheek and force it between the open jaws, so that, if the child attempts to bite, it will be deterred by biting its own cheek. The right index finger having a short nail, and having been rendered as aseptic as possible, is quickly inserted behind the palate and the back of the septum felt for. Having made this out, the two eustachian prominences will be felt relatively quite large in children. In a pharynx without adenoids, with the back of the finger tip, some soft tissue will be felt in the vault and perhaps high up on the posterior wall, and the two posterior nares will be felt free from obstructions. But where there is enlargement, the finger will feel a fissured mass, soft and more or less movable, which may be so large that the finger is with difficulty inserted between it and the septum. This usually bleeds easily, and upon withdrawing the finger, even though the examination has been most gentle, blood and small pieces of granular tissue may be brought out. Older children may have a centrally located and harder mass which does not bleed easily. A detailed examination of the contents of the nasopharynx may thus be made, if the mass is not so large that it is impossible to use the finger. In very small children and infants, a dull curet or probe may be used.

CONTRAINDICATIONS.

First.—Do not operate during acute conditions. In all coryzas and acute lesions of the nose and upper respiratory tract, adenoids are involved in the general congestion and may give decided symptoms where they have otherwise not been apparent.

During the infectious diseases they are involved and for some time after the child has been discharged as cured. Although they may be a contributing cause of acute catarrhal or purulent otitis, it is not safe to remove them during the acute stage of the ear involvement. Pneumococci or streptococci may be present in the nasopharynx, and a fresh, wounded surface only opens new avenues of infection. Even though the adenoids may be large obstructive masses, it is better to wait three or four weeks after any acute invasion of disease before removing them.

Second.—Do not operate on children who have some grave constitutional disease, such as hemophilia, nephritis, diabetes, leukemia, syphilis or tuberculosis. This refers to the ordinary cases where the adenoid growth is present, but where it is not doing enough harm to risk the shock, no matter how small, of an operation. In certain cases of marked obstruction, where the child is evidently doing badly on that account, the operation may be undertaken, all things being weighed pro and con.

Third.—Do not operate just because there are *some* adenoids present. There may be nasal obstruction with a mass of adenoids too small to cause it, which is caused by enlarged turbinate bodies, deflected septa, new growths or even foreign bodies, undiscovered. Large faucial tonsils may give many of the symptoms of adenoids and yet the adenoids themselves be comparatively small.

Fourth.—While it is true that adenoids may cause some of the reflex disturbances above mentioned, other causes may be more important, and, unless the general physical examination excludes them, do not think it necessary to submit the child to an operation for *small* masses in the pharynx.

Fifth.—It is not a good plan to operate during epidemics of the infectious diseases, especially upon school children.

THE TIME TO OPERATE.

Given a child under the age of second dentition, who is suffering from the presence of adenoids, should we wait for any reason except manifest contraindications?

Emphatically, *no.* Beginning at about the age of second dentition, the child's facial bones are undergoing several important changes. The accessory nasal sinuses are being invaginated into the frontal, ethmoidal, sphenoidal and maxillary bones, the hard palate is taking shape together with the dental arch, the facial bones are becoming more permanently shaped and harder, and the chest is developing. Nasal occlusion is the one great factor in malformation of these several localities. Parents should be educated to the importance of this and not allow their children to go months and years with apparent nasal occlusion without consulting a physician about it. I am glad to hear parents talk about adenoids and enlarged tonsils. At the Clinic we are getting a flood of school children, thanks to the more rigid school inspection, with various lesions of the nose and throat. In not every case, by any means, where there is a diagnosis of adenoids on the cards, is it necessary to operate, but in many it is.

In the Department for Diseases of the Nose and Throat in Vanderbilt Clinic, during the years from July 1, 1904, to May 1, 1907, there were recorded 2,820 operations. In 52 per cent. of these adenoids were removed.

662	adenectomies	average age	9 yrs.,	3 mos.	—32 yrs.
805	“ and tonsillotomies	“ “	7.7 “	5 “	—34 “
309	tonsillotomies alone	“ “	11.2 “	2 yrs.	—37 “
1,776					

The sexes fared about alike, except that 75 more operations for both adenectomy and tonsillotomy were performed on females than upon males. Of course, these figures include patients of all ages; but, if those below the age of twelve were taken, the percentage of adenoid removals would be greatly increased.

In my private practice the age average is younger, thus:—

Adenectomies	7.6 years
“ and tonsillotomies	6.3 “
Tonsillotomies	22.2 “

The age average is too high. In a great majority of all these cases, both in the clinic and in private practice, the little patients had suffered months with adenoids and, in many, years. In the older children, permanent injury had been done to the shape of the face, dental arches, and chest, mental condition and hearing, not to speak of general physical development.

METHOD OF OPERATING.

The operation is done with and without an anesthetic. While I believe the majority of operators recommend and prefer the use of anesthesia, there are some who say: "Always operate without an anesthetic, except where the child is too strong to be held." Others say: "To operate without an anesthetic is brutal and unscientific."

In infants and very young children, the use of anesthetics may best be dispensed with and, in fact, the obstruction is often so large that the use of an anesthetic is dangerous. In these very small patients, the operation can be done quickly with a uterine curet bent up as I show you. I have operated upon quite a number of infants who were unable to nurse, in this way, and they have been put to the breast immediately after the bleeding has stopped and have had their first comfortable meal. The amount of pain and reaction was apparently so slight as to be ruled out.

The latest figures on the mortality from the different anesthetics have recently been published in an article in the March *Laryngoscope,* and are as follows:—

Chloroform deaths	1-1,000	some 1-5,000
A. C. E. mixture	1-7,500	
Ether	1-10,000	
Ethyl chlorid	1-12,000	(23 deaths in England in one year)
Ethyl bromid	1-16,000	
Nitrous oxid	1-100,000	

Children take nitrous-oxid gases badly and it very much congests the head. Chloroform and A. C. E. mixture may be used, but, as the figures are high as to mortality, to use them is like getting on the front end of a moving car instead of the hind end. If a man falls while doing the former, he gets his legs cut off; while, if he falls from the hind end, he suffers little. I have had no experience with ethyl bromid, but our English and German operators seem to prefer it to the chlorid. While ether can be given to children by the drop method, with no choking or struggling to speak of, it stimulates buccal secretions and produces more congestion than the ethyls. These secretions fill up the throat, are apt to be swallowed and ether produces vomiting in most cases.

Ethyl chlorid has proved in my hands very satisfactory. It is easily taken without struggling, very slightly stimulates secretions, produces a minimum of congestion, anesthesia comes on promptly and lasts long enough to do a thorough operation, and then the patient comes out quickly and should not vomit nor have nausea, unless blood has been swallowed.

It is best given from a tube of kelene sprayed into a special mask or on an ordinary chloroform mask. Enough is given to relax the jaws, but the pharyngeal reflexes need not be abolished. If the operation is simply for adenoids, the patient is out from the effects of the drug in time to help himself, but not so fully out that he will be frightened by the sight of blood, etc.

It is preferable to anesthetize the child in bed, so that it will not see the preparations for the operation being made in another room. If the tonsils are to be taken out, they should be removed first, otherwise the field would be flooded by the blood from the adenoids.

THE CHOICE OF INSTRUMENT.

To my mind, one should use that instrument with which the greatest portion of the mass can be removed in one motion. This will shorten the operation materially. There is no better means of doing this than by the curet. In small subjects, the advantage of the curet over the forceps is its taking up less space for its introduction and manipulation. The forceps now used are protected so that it ought to be impossible to injure the vomer and uvula, but they are bulky and, for the larger masses, have not the room to take most of the growth at one cutting. The fault with the original Gottstein model of the curet was its triangular shape; the narrow portion acted as a plow and forced the growth to one side of the cutting edge.

Two sizes should be laid out for an operation, viz., the largest for your given pharynx, measured by the space between the faucial pillars, and a small size for cleaning out the fossæ of Rosenmueller and any tags that may be felt.

METHOD OF OPERATING.

Place a table so that one side will be facing a window, cover with blanket and sheet. One small table on which to spread instruments on sterilized towel. Better to have instruments dry, especially the handles, for wet, slippery handles are bad things to do good work with. (Of course, it is understood that everything is done under aseptic precautions.) Child brought in anesthetized and head done up in towel, especially if it has long hair; body wrapped in sheet and child placed on left side facing window. Mouth-gag inserted, on upper side if the Denhard model is used. With the left hand on back of head, bend head slightly forward and thus make a rounded pharyngeal cavity. If the head is bent backward, the atlas is made prominent and the pharynx immediately above it may be made somewhat inaccessible to the instrument. An advantage of using one hand on back of head is that the operator has, as it were, the growth between his hands and can better regulate pressure and direction of curet. With the large curet, slide it along tongue, depressing that member and inserting instrument by direct vision—always see what you are doing—under palate and up in front of growth. Then depress handle so that growth will prolapse into lumen of curet and, pressing upward, backward and then downward and always backward, you will bring away most of the mass with one movement of the instrument. It is necessary to keep in the middle line, start well upward and forward with the front end of the cutting-bar touching the vomer, and in finishing the stroke be sure you hug the posterior pharyngeal wall so that no part of the growth will be left hanging in the lower pharynx. When this is done, it will set up gagging by flopping in and out of the orifice of the larynx and also keep up the bleeding when the patient comes to. Get the mass out of the mouth and save it to show to the parents. Then, with the smaller instrument, clear out the lateral recesses and any soft areas that may be felt, so that the remaining tissue that is left feels firm. The sensation is exactly like that one gets when using the uterine curet and it is not at all necessary to introduce the finger into the pharynx. The small curet should take the place of the finger. After the pharynx has been thus cleaned, the patient should be quickly turned face down and the blood not allowed to flow into the throat. The whole operation takes much less time than its description and, if no blood has been swallowed, there will be no vomiting and the patient will come out of the anesthesia practically as soon as he has been turned on his face and, though he may not be conscious enough to realize what is going on about him, he will respond to the request to clear his mouth, etc. The bleeding should stop in about 90 seconds, if firm tissue has been left and no tags of adenoids. This bleeding may be somewhat lessened by not using too sharp an instrument and too much pressure. The object of the operation is to remove the adenoids and not the underlying mucous membrane.

After the bleeding has stopped, the child may be put back to bed and kept there for twenty-four hours and also kept quiet for another twenty-four hours, and, in children, this is best attained by confining them to bed. Sucking ice will relieve the soreness. The food should be cool and liquid for twenty-four hours and soft for the next day. After that the child will be able to eat as normally, for the seat of an adenoid operation does not come in contact with the food as does the site of the faucial tonsils.

Unless there is sloughing or an usual amount of secretion from the adenoid region, local means of treatment are best let alone. If, from a very extensive wounded surface, there is discharge and local reaction, a mild alkaline nasal douche may be used under the usual precautions with regard to the ears.

The foregoing is a rapid and satisfactory method, in my experience, of operating with an anesthetic. If we are to consider the removal of these growths without the use of anesthesia, it must be said that though it may not be the ideal way, yet, by reason of circumstances, it must be the method of choice at times. For instance, in patients who will not bear an anesthetic, in older children with localized growths which can be engaged in a curet and removed *in toto* in one sweep, and in the crowded condition of dispensary work where there is not the time to give to each patient that ideal surroundings would demand.

The condition of the child must be taken into consideration. An apprehensive, nervous child, who has been frightened or hurt by some former manipulation or operation, may be subjected to a marked nervous shock by holding him and removing the adenoids without an anesthetic. On the other hand, a sensible child, who can understand that the operation is best for him, but that it will hurt—for I never tell a child that what I am about to do will not hurt—and who can be made to look upon it as a trial in fortitude, can be readily operated upon while held in the intubation position, but it requires good nerve, and a second cureting with the smaller instrument is very painful. However, the majority of the cases reported from the Clinic have had their adenoids removed and the combined adenectomy and tonsillotomy done in this way. There has been a good deal of noise, weeping and general disturbance, and the method in the great majority is not ideal. Still, physically, these children have been done an immense amount of good.

RESULTS.

You will be asked a number of questions by the parents of these little children:—

(1) Is the operation necessary? You are to judge by frankly considering the indications and discussing them with the parents.

(2) Will not the growths disappear by themselves? There is the natural shrinkage at and after puberty, but the younger the child *with* indications, the more injury done during the years until he reaches puberty. Results are best in children between ages of four and eight.

(3) Is the operation a dangerous one? No. Of course, no operation is entirely free from dangers and sequelæ.

(4) Is it necessary to give an anesthetic? Explain that it can be done better and will do less harm to the child, as a rule, to use an anesthetic. Profound surgical anesthesia is not desired.

(5) Will the growth recur? This question cannot be answered out and out in the negative. One can do an operation so severe that the pharynx will heal up as one big scar; but that is not the purpose nor the desirable result of the operation such as I have described. Growths do, most assuredly, recur, but I had rather subject my child to two operations than to leave it with a dry, scar-tissue pharynx for life.

(6) Will the operation cure the child of all its troubles? It can be safely promised that the child will be given a better chance to develop normally, to get better sleep, render it less liable to taking cold and infections of various kinds, improve its mental vigor and hearing, depending upon how long the condition has existed. The child who has already got its second teeth, a crooked and narrow palate, compressed face, o. m. c. c. and hypertrophic rhinitis will not show the improvement that it would have shown were the adenoids removed months and years before. The education of the parent by you pediatrists is my final plea.

104 East Thirty-ninth Street.

OCULAR SYMPTOMS AND DISEASES ACCOMPANYING ADENOIDS.*

BY CHARLES H. MAY, M.D.,
New York.

A certain number of ocular symptoms and diseases occur with sufficient frequency in children who have adenoids, to warrant the assumption of a relationship between the nasopharyngeal and the ocular conditions. These anomalies consist of epiphora, blepharitis, catarrhal, and more rarely purulent, dacryocystitis, congestion of the conjunctiva, phlyctenular conjunctivitis and keratitis, subacute and chronic conjunctivitis, certain forms of conjunctivitis bordering on the trachoma type, and true trachoma. None of these ocular symptoms and affections can be properly considered as due entirely to the existence of adenoids, since they are all found in children who are free from the latter; but they frequently accompany the adenoids; the existence of the nasopharyngeal condition aggravates the ocular anomaly, and the removal of the adenoids causes a disappearance of the ocular affection in some cases, and in others makes the cure less difficult.

The adenoids should be regarded as a predisposing factor rather than as a direct cause. If we stop to consider the congestion of the nasal mucous membrane and the consequent catarrhal inflammation of this membrane produced by the adenoids, we will readily understand how, in the same manner, the neighboring conjunctiva will become congested and be disposed to catarrhal inflammation. We are familiar with the appearance of the mucous membrane of the nose in children affected with adenoids —the swollen and congested turbinates and the excessive secretion, and also with the fact that these nasal symptoms disappear without any treatment of the nose after removal of the adenoids. Not only is there apt to be congestion, but the catarrhal inflammation travels up the lacrymal duct and thus infects the conjunctiva by contiguity.

Epiphora, or excessive lacrymation, is frequently seen in children affected with this condition, and very often without any change in the conjunctiva or in the lacrymal sac or duct except congestion. Such epiphora is not infrequently an annoying symptom in infants, and where there is an absence of visible change in the conjunctiva, and the lacrymal sac seems normal, adenoids should be thought of, or rather nasal congestion or catarrh dependent upon adenoids, for, as far as my experience goes, rhinitis in infants usually depends upon the existence of adenoids, or of hypertrophied tonsils, or of the two combined. The blepharitis, catarrhal conjunctivitis, dacryocystitis, and the phlyctenular affections can be explained in the same manner—the local predisposition is produced by the congested conjunctiva.

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* Read, by invitation, at the May meeting of the New York Academy of Medicine, Section on Pediatrics.

When we study the structure of adenoids, and consider the fact that they are composed of lymphoid material, and that trachoma follicles are made up of the same sort of tissue, it is not surprising that the two conditions are often found in the same child. There is one form of conjunctivitis which I have found particularly prevalent in children affected with adenoids; this is the variety about which there is at present a great deal of controversy as to whether such cases are instances of real trachoma, or are examples of subacute conjunctivitis with follicular hypertrophy. As we are all aware, ever since the Board of Health instituted systematic examination of the eyes of children in the public schools, it has been found that a considerable number, fully one-quarter or one-third, are affected with some form of conjunctivitis. Many of these cases admit of no difference of opinion regarding the diagnosis, and all authorities would pronounce them trachoma. Many others are examples of acute and chronic conjunctivitis; a great many, constituting a considerable proportion of the children of the public schools, who are required to submit to treatment of their lids, have a catarrhal conjunctivitis with more or less follicular hypertrophy; these are the sort of lids which we frequently find in children who have adenoids. These are not examples of true trachoma. No one has ever demonstrated or proven that if neglected such cases will produce pannus, ulcers of the cornea or distortion of the lids—the sequelæ which lead to blindness in true trachoma. Very often the question is evaded by calling such cases "mild trachoma." One observer will designate such examples as trachoma or "mild trachoma," while another, equally skillful, will make the diagnosis of catarrhal conjunctivitis in the same patients. Only recently Derby, of Boston, in an article in the *Boston Medical and Surgical Journal,* called attention to the fact that an injustice was often done to immigrants by the United States authorities, when the latter failed to distinguish between real trachoma and this form of conjunctivitis.

I would not like to appear as criticising the Board of Health for its work in attempting to stamp out this and all other forms of conjunctivitis; on the contrary, I think this department is entitled to a great deal of credit for its activity in this direction. The particular form of conjunctivitis to which I am alluding is contagious; when a second patient contracts this disease, however, the type will remain the same and will never change to real trachoma. Since many of such forms of conjunctivitis are classified as trachoma, the statement that one-third of all the children in the public schools are affected with trachoma will not appear so alarming when viewed in this light. The removal of adenoids in these cases does not appear to influence the conjunctival affection; the latter requires local treatment, about which, just as in the case of the diagnosis, there exists considerable difference of opinion.

698 Madison Avenue.

INTERNAL HYDROCEPHALUS.—W. J. Spiller and A. R. Allen (*Journal of the American Medical Association*) discuss the causes of internal hydrocephalus, reviewing the literature, and remark that while the occlusion of the aqueduct of Sylvius is not infrequently mentioned as an etiological factor in the text-books, it is rare to find references to actual cases of such occurrence. They take the opportunity, therefore, to report a case in which the condition was induced by a probably congenital, almost total occlusion of the aqueduct. The subject was an elderly woman, who was supposed to have been born hydrocephalic, but in spite of this and of an epilepsy that had lasted for years she had lived to the advanced age of sixty-two, and retained her faculties fairly well developed. The aqueduct, while almost entirely occluded, was well lined throughout by a layer of ependymal cells, which would not be the case had its occlusion been due to neuroglia proliferation, as in a previous case reported by Spiller. This, and the long continuance of the condition through the patient's whole life, indicates the congenital nature of the obstruction.—*Medical Record.*

ADENECTOMY DURING ACUTE MIDDLE-EAR DISEASE.*

BY PHILIP D. KERRISON, M.D.,
New York.

Upon the subject of removing adenoids during an attack of acute otitis media there is a difference of opinion. So far as I have been able to learn, the majority of throat surgeons and otologists are decidedly opposed to the removal of adenoids during acute tympanic disease. So much can be said on both sides that no one at the present time can afford to be dogmatic. But, personally, I am inclined to believe that there are many cases of acute otitis media in which there should be no delay in the removal of the adenoids.

In order to stand on common ground with those who hold the opposite view, it may be well to admit one fact at once, viz., that in a certain small percentage of cases operated on in which no aural disease has been known to have existed, acute middle-ear inflammation occurs as a direct result of the operation. The percentage is small, but such cases do exist.

In considering the question of adenectomy during acute middle-ear disease, I have in mind a class of cases which we see every day in the ear clinics. A child with acute catarrhal or acute purulent otitis media is brought to the hospital for treatment. One or both drum membranes are red and bulging. The faucial tonsils are moderately, or, perhaps, immensely enlarged, and there are physical evidences of considerable masses of adenoid tissue in the nasopharynx. Shall we anesthetize this child and incise the drum membrane, wait for the tympanic inflammation to subside, and place him on the table a second time to remove the adenoids? In determining this matter I think that we should ask ourselves two questions: (1) Is the ultimate removal of the adenoids and tonsils an obvious necessity? and (2) Will the pharyngeal growth retard or check tympanic resolution? If the adenoids are of sufficient size and so located as to leave no doubt as to the necessity of removing them, then there can be little doubt as to their retarding effect upon tympanic recovery, and, in such a case, I think that the child should be placed under the influence of a general anesthetic, the drum membrane incised and the adenoids removed at one and the same time. In support of this proposition may be mentioned the following facts:—

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* Read before the New York Academy of Medicine, Section on Pediatrics, May 9, 1907.

(1) Either operation is most successfully done with the patient under the influence of a general anesthetic. By combining the two operations, we in most cases obviate the necessity of repeated anesthetization. With the parents, this assumes considerable importance.

(2) Adenectomy entails some risk to the healthy ear. When the ear is already acutely inflamed is, therefore, a favorable time for throat operation, for by free incision of the drum membrane we in considerable degree safeguard the ear from further damage.

(3) The free abstraction of blood from the nasopharynx which always accompanies the operation for the removal of adenoids, distinctly favors tympanic resolution. There can be no doubt as to this point. An old therapeutic measure in otitis media—one mentioned in most text-books on otology—was the abstraction of blood from in front of the tragus. But blood-letting from this region of the pharyngeal mouth of the tube is not only more rational, it is actually more effective.

(4) There are undoubtedly many cases of acute otitis media in which recovery is not only tedious and slow, but in the final outcome incomplete until the adenoids have been removed. That is to say, even after the discharge has completely ceased, and all subjective symptoms have subsided, the drum membrane remains retracted and congested, and slight causes induce recurrence.

I fully believe that the mere existence of hypertrophied lymphoid in the nasopharynx is not necessarily an indication for its removal. The operation is positively indicated only when there is evidence that the growth is interfering with the respiratory or aural function, or causing tissue changes in contiguous structures.

(Discussion on page 67.)

ACQUIRED SYPHILIS IN AN INFANT, WITH TRANSMISSION TO MOTHER.—J. A. Nixon (*British Medical Journal*) reports a case in which there seems to be no doubt that the mother had acquired syphilis, and that the breast had been the site of the chancre, which was derived from a similar and earlier lesion on the child's lip. The origin of the latter remains unexplained.—*Medical Record.*

ARCHIVES OF PEDIATRICS.

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CORPORAL PUNISHMENT IN THE PUBLIC SCHOOLS.

The difficulties in the way of maintaining proper school discipline seem to be increasing. This is particularly so in cities in which there is a large foreign population who have left behind them that blind obedience to authority demanded from the masses in monarchical countries, and who have not as yet learned that freedom is not license, and is only possible under conditions of a general self-control. Children of such homes, accustomed to rigid authority and the rod, greatly multiply the difficulties of the school mistress. These, coupled with the small percentage of those who are distinctly anti-social in their feelings, and those who have little or no home control, form the great problem of school discipline.

When a boy throws an inkstand at a teacher and then defies both her and the principal, saying that they dare not touch him, a situation is created that involves not only the boy but the morale of the whole school. The rest of the school has its rights as well as the defiant boy. The parents and taxpayers also have rights. Their rights are to have their children in a school that is orderly and quiet, where law is observed and the right attitude toward authority maintained. Some teachers of wide experience and good judgment maintain that not only the good of the boy, but that of the rest of the school, involves the right to use corporal punishment.

There are cases and occasions when corporal punishment, administered under right conditions, is of great value. We raise no question as to such cases. The real question is: Whether the right to whip or flog shall be given to any or all of the teachers and principals in a school system.

Punishment given at once in the heat of resentment is most dangerous. It gives the impression of being given on account of anger rather than in the interest of morals. On the other hand, punishment given long after the offense, by some other person than the one offended, and upon written charges, seems to fail completely in its moral effect. Corporal punishment as an abstract proposition is quite a different thing from what it is when it is considered in its practical application.

If all teachers were ideal, there would be no need of added powers of discipline, but any plan that involves for its successful operation ideal human beings must fail. We all have our failings, and schemes of government must deal with the actual rather than the ideal.

It is our function to point out that the general consensus of medical opinion is rather against corporal punishment as a means of securing discipline in the public schools.

(1) The investigations of Dr. John J. Cronin, in connection with the school children of the public schools of New York City, and of others, have shown that a considerable fraction of the pupils who are truants, and of those who are so-called incorrigibles, have physical defects of more or less serious character.

There is also ample evidence at hand to show that, with the removal of these physical defects, many become amenable to the ordinary forms of discipline. To whip children who have low mentality, because they do not successfully respond to mental stimuli, is not only absurd, but tends toward the development of the criminal type, in that it lowers still further the grade of those children so treated. It tends to emphasize the lower motives, such as fear, rather than the higher motives, such as hope. No treatment of the feeble-minded has ever been successful which has been based upon fear; only those have been successful which have been based upon hope and love. The epoch-making work of Dr. Seguin is quite in evidence.

(2) Children are frequently punished because they are inattentive and restless. This is predominantly due to fatigue, defects of vision, inability to hear well without conscious effort, or because of adenoids, resulting in improperly aerated blood. Under such conditions, corporal punishment is vicious.

(3) Children who are restless because of abnormally sensitive nervous organizations are sometimes punished because of such restlessness. This, in many cases, has led to mental disturbances, to pathological mental states, and thus is to be excluded on hygienic grounds.

(4) Punishments are sometimes given because the teacher is fatigued and irritable. The teacher is incompetent to tell when this is the case. Some days there are regular crops of disturbances that seem to call for corporal punishment, while on other days there are practically none. These are due to some extent to changes in the weather, affecting pupils and teachers alike. To punish for and under such conditions is manifestly absurd.

(5) In view of the well established facts as to sadism and masochism, corporal punishment should only be given under conditions of the greatest care as to the possible presence of such sexual perversity in either pupil or teacher. Such care is well-nigh impossible.

(6) In view of the fact that the discipline of school is not a function of the amount of punishment given in it, and that the measurement of the amount of punishment the teacher uses is a measure of her inferiority rather than of her superiority, it seems reasonable that corporal punishment should be abolished.

(7) Corporal punishment involves a loss of self-respect on the part of the pupil. Self-respect is the most valuable asset making for good conduct, and must be secured by every means within our power. From this standpoint, corporal punishment should be altogether abolished.

(8) There are on record enough cases of injury of a permanent character, inflicted on children by teachers, to make the giving of corporal punishment by teachers recognized as a hazardous matter.

(9) In view of the progressive history of corporal punishment (*a*) by the State for crimes committed by citizens, (*b*) in the army and navy, (*c*) its lessening or abolishment in schools, (*d*) its steady lessening with the progress of civilization in the family, the abolishment of corporal punishment in schools appears to be one of the goals toward which we are coming.

The history of punishment does not at all teach that the severity of punishment is directly related to infrequency of crime. When petty thieving was punishable by death, it was apparently as frequent as it is now.

The Boston public schools now employ corporal punishment. Few, if any, other large American cities do so. No one appears to claim that discipline is materially better in the Boston schools than it is elsewhere.

In some school systems that have changed from having to not having corporal punishment, the year following the change has been marked by insolence and pupil outbreaks. These are almost inevitable. The new form has not yet had time to develop its own power. Two or three years are needed to restore disciplinary equilibrium.

The history of corporal punishment in schools is in the main the history of inefficiency, with confession that the teacher must descend from the higher intellectual levels and appeal to the superiority of brute strength.

This discussion, it is to be remembered, is upon one point only, namely: Shall the *school authorities* have the right to whip children?

It seems to us that it is still necessary for parents to use this power at times, but the discussion of this topic would involve more space than can be at present given to it.

There is real need by school teachers and principals of added disciplinary powers. These, however, must be discovered by the school authorities. The general direction of such solution seems to be (1) in the lessening of the size of classes. The quantity of punishment needed seems to increase directly and faster than does the number of children in the class. The more personal the relation between teacher and class, the less need of corporal punishment. (2) The better adaptation of the curriculum to meet the interests as well as the needs of the average boy and girl —manual training, vocational training, etc.—seems to be increasingly needed even from the standpoint of morals. (3) The segregation of the difficult cases in small classes under teachers having special ability in holding and caring for such cases.

LUTHER HALSEY GULICK, M.D.,
Director of Physical Training, New York Public Schools.

TETANY.—Chovstek (*Wien. Med. Woch.*, No. 23), says that all those factors which previously have been considered as being the etiological cause, are merely exciting causes. In individuals affected with tetany, the onset of menstruation, an angina, or, as the author has seen, the injection of tuberculin, is sufficient to excite an attack. The specific cause of the reaction in tetanic individuals is a constitutional one, and is probably associated with a functional disturbance of the parathyroid glands. —*Boston Medical and Surgical Journal.*

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, May 9, 1907.

GODFREY R. PISEK, M.D., CHAIRMAN.

SYMPOSIUM ON ADENOIDS.

DR. SAMUEL W. THURBER read a paper on

THE INDICATIONS FOR AND AGAINST REMOVING ADENOIDS AND METHOD OF OPERATING.

(For this paper see page 43.)

DR. CHARLES GILMORE KERLEY said that we found adenoids in all classes of society, in both country and city, in the sickly and in the robust. He was impressed with the fact that those who had the sucking habit, using the thumb, pacifier, or anything else, were the most frequent subjects of adenoids. It was easy to understand how the vessels of the fauces and the pharynx could be brought to a condition of hyperemia and stasis as a result of the vacuum produced by this habitual sucking. The nasopharyngeal spaces in young children were very narrow, and sucking produced more or less friction of the soft palate against the posterior wall, particularly in those with high arched palates, causing hypertrophy and congestion of the glands of the parts. Much could be done in the way of preventing adenoids by restricting this habit of sucking.

Another feature of adenoids, he said, was "colds." Children with adenoids usually gave a history of frequent colds before the positive signs appeared, and, if we were going to get at the bottom of the matter, the causes of frequent colds in all conditions of children must be discovered. He believed, too, that there was a dietetic error here. Children who had frequent colds were often in the habit of taking too much sugar or had a sugar incapacity. Children of the gouty type were more liable to colds and bore sugar badly. It seemed to Dr. Kerley that this matter of sugar intake was a factor in the production of adenoids of more importance than was generally appreciated.

It seemed to him that in the matter of operating, a man had the best success with the operation and the instruments with which he was the most familiar. The operations should not be performed during any acute inflammatory process, or during disease of any nature unless urgently called for, as in the course of a persistent suppurative otitis. The operation could be done at any age when the growths were large enough to produce trouble. Ether given just to the abolition of the reflexes, was his preference for anesthetic. After the operation he was in the habit of going over the field of operation with sterilized gauze on his index finger. This was an excellent hemostatic.

Patients should be kept under observation for some time after the operation, for often cobweb adhesions formed between the posterior pillars and the soft palate or between these and the posterior wall binding these structures together, producing an obstruction as great as the adenoid growth had done before, and giving the idea that the adenoids had returned.

Dr. B. van D. Hedges, of Plainfield, N. J., said there were many interesting cases in which the trouble seemed at first obscure, but which were finally found to be due to the presence of adenoids. He referred to those cases occurring in children under five years of age, with severe constitutional disturbances, swelling of the submaxillary and cervical glands, temperature running from 102 to 105, lasting one to three weeks, then subsiding for a few days, only to start up again and pursue the same course. In eight or ten of these cases that he had seen this year the pharyngeal tonsil was found to be enlarged and inflamed and the initial cause of all the trouble.

As to the diagnosis of adenoids, this must be made with the index finger, the use of the mirror in children being very unsatisfactory. When the diagnosis was once made, they should be removed. In malignant cases of diphtheria, and in scarlet fever particularly, the fatal cases most frequently occurred in those children with enlarged adenoids.

As to the operation itself, it had always seemed to him to be a crime to operate without an anesthetic. He had seen children thrown into a nervous state from which it took months for them to recover. As to the choice of anesthetic, he did not believe that chloroform should ever be given, as there seemed to be a high mortality in these cases from its use. Ether was much safer.

As to the method of procedure, the child should be placed on its left side with a little elevation of the shoulders. An artificial light, reflected from a head mirror, gave the most satisfactory illumination of the pharynx.

Dr. Hedges said he formerly used the curet in adenoid operations, but he now preferred the forceps.

He quoted Calhoun, of Atlanta, as stating that he had never seen adenoids in colored children, and Dr. Hedges asked what the experience of others had been in this respect.

OCULAR SYMPTOMS AND DISEASES ACCOMPANYING ADENOIDS.

Dr. Charles H. May read this paper. (See page 54.)

RELATION OF ADENOIDS TO DISEASES OF THE LUNGS.

Dr. David Bovaird said that the relation of adenoids to diseases of the lungs was very simple. If the natural channels of respiration were blocked, and the child or adult forced to breathe through the mouth, conditions were established which were favorable for the development of inflammatory processes in both bronchi and lungs. This fact all were familiar with. It had always seemed to him that the presence of adenoids, just as it led to bronchitis and bronchopneumonia, might lead to tuberculosis of the lungs. The question of the paths of infection in tuberculosis was very much entangled and confused at the present time, but there was no question in his mind that the infection was frequently respiratory. Therefore the presence of adenoid growths was an important factor in children in relation to tuberculosis.

There was also a possible production of asthma by adenoid growths. In adults nasal deformities and obstructions were important factors in the production of asthma. In recent years it had been recognized that the presence of adenoids might be an exciting cause of repeated attacks of asthma, and the removal of adenoids would often be followed by the disappearance of the asthmatic attacks.

Dr. Bovaird further said that there was an effect upon the thorax which makes one more liable to disease; for instance, the flat chest which is seen in children who have adenoids.

Dr. Philip D. Kerrison read a paper on

ADENECTOMY DURING ACUTE MIDDLE-EAR DISEASE.

(See page 57.)

DR. WALTER E. SPICER said that there was no doubt in his mind that adenectomy cut short the period of suppuration in otitis media if the operation was done before there was any destruction of the ossicles. A free paracentesis should be done at the same time. In operating, he used chloroform with considerable success, and preferred the Brandegee forceps followed by the Gottstein curet.

DANGERS OF ADENECTOMY.

DR. JOHN MCCOY divided the dangers into four heads:—

I. Traumatism. Many men, not being conversant with the locality in which they were operating, inflicted a great deal more trauma than should be inflicted.

II. Hemorrhage. Not less than six deaths had been recorded from this alone, and many more had no doubt occurred which were not recorded. Even if death did not occur, a condition of severe anemia might be caused from which it would take some time to recover. One should always inquire into a history of hemophilia. Hemorrhage might be due to a fibrous tonsil or to an abnormal distribution of the vessels supplying the tonsils or pharynx. Hemorrhage from the adenoids was usually due to too sharp an instrument or to too much pressure being applied or to the biting out of a portion of the spheno-palatine artery. The use of adrenalin and cocain conduced to secondary hemorrhage.

III. Sepsis. Infection of the cervical glands, cellulitis of the neck, or retropharyngeal abscess might occur. Even torticollis might be caused by infection of the deep chain of glands.

IV. Anesthetics and Posture. Ether he believed to be the safest anesthetic, and the sitting posture the best for preventing the pharynx filling with blood.

DR. E. LIVINGSTON HUNT said that we could consider adenoids as neither a predisposing nor an exciting cause of epilepsy. The way to regard them was as a reflex cause and in the effect which they had on the general health of the patient. As one of the main objects in the treatment of epilepsy was to improve the general health of the patient, we ought to remove the adenoids in so far as they affected the general health of the patient in each individual case. As regards the results, we all had seen cases benefited by their removal, and cases in which no change followed their removal, but he thought that none of us had seen cases in which a removal of the adenoids was followed by an aggravation of the epilepsy. Therefore, on the whole, he thought that the epileptic child was benefited by the removal of his adenoids.

IMPROVEMENT OF SCHOOL CHILDREN IN NEW YORK AS A RESULT OF ADENECTOMY.

Dr. John J. Cronin said that among the "backward children" in New York City, a large proportion were found to have enlarged tonsils and adenoids. In one school made up from the truant school, the Juvenile Court and Randall's Island, of 150 children examined, only three were found without some physical defect. Of these, 137 had adenoids and large tonsils. They were operated on, sent away during the summer to good hygienic surroundings and good food, and when they came back they looked like a different set of children.

It had been noticed that 88 per cent. of children attacked by diphtheria, who were examined for them, had large tonsils and adenoids, and Dr. Cronin thought that if the number of enlarged tonsils were reduced before the children went to school, the number of cases of diphtheria would be much smaller.

Dr. S. W. Thurber, closing the discussion, said that adenoids were not as common in races living in warm climates where they did not shut themselves up in close huts as they were in races which, though they lived out of doors, still spent considerable time in close rooms, such as the Esquimau tribes, where adenoids are frequently found.

In regard to colored children and adenoids, at Vanderbilt Clinic they found many colored children with them, especially the very young infants, showing that the living conditions in the North will predispose to adenoids when they would not be found in the open-air conditions of the Southern negroes.

In regard to tuberculosis and adenoids, he had operated upon some of the children at Sea Breeze and found, in two cases which were apparently in very good general condition, that the adenoids which were removed were tuberculous.

To increase the coagulability of the blood he used lactate of calcium, given before and after the operation.

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, May 14, 1907.

J. W. VanDerslice, M.D., President.

A CASE OF INTERVERTEBRAL RHEUMATISM ASSOCIATED WITH TIC.

Dr. J. M. Dodson presented a boy of ten years, who for four weeks had had pain in the back in the upper dorsal and cervical regions with a peculiar jerking backward of the trunk, evidently due to a tic of the erector spinæ and repeated every few minutes when his attention was not drawn to something else. Then it disappeared, as it did also during sleep. The reflexes were normal and there were no disturbances of the special senses.

The boy had had measles and whooping-cough and a short time before was treated for rheumatism. There was a soft-blowing, presystolic murmur over the heart. He did not now show any affection in any joints but the vertebral. There he had definite pain and definite tenderness and would avoid bending his spine at this point when he picked anything up.

The diagnosis of rheumatism of the intervertebral joints was made on the exclusion of disease of the bodies of the vertebræ (X-ray examination having shown them to be normal), and of organic nervous diseases; on the previous rheumatism, and on the fact that extension of the spine produced as much pain as did compression.

Dr. Dodson said that in children rheumatism was likely to come on in a rather obscure, indefinite way. A number of instances of rheumatism in the intervertebral joints had been reported and it seemed here to show itself in the upper dorsal and cervical vertebræ, more particularly in the cervical region.

Dr. R. A. Black presented, for Dr. Cook, a boy of between six and seven years, who for several months had been retrogressing mentally, had been having difficulty in controlling micturition and had shown difficulty in walking. The reflexes were exaggerated.

There was a history of three or four possible miscarriages. At one year of age the boy had a single spasm which was thought to be due to influenza. A week or so before this trouble came on he had a fall and knocked out some teeth but sustained no other injury and was not unconscious.

The case was regarded as one of syphilitic disease of the central nervous system, and treated as such on the basis of the possible miscarriages and the fact that the child was normal up to the age of six years.

Dr. I. A. Abt thought that the most probable explanation of the trouble was a certain degree of encephalitis in the motor area.

Dr. S. J. Walker reported a typical case of

INTESTINAL TUBERCULOSIS WITH PATHOLOGICAL SPECIMENS.

The interest in this case lay in the fact that it was undoubtedly one of primary tuberculosis, either of the intestines or of the mesenteric lymph nodes.

Dr. Walker said that intestinal tuberculosis following tuberculosis of the lungs was very common in children. On the other hand, primary tuberculosis of the intestinal tract was much more often seen in children than in adults for the reason that the mucous membrane in children was much more susceptible to inoculation and for the further reason that the food of children consisted largely of raw milk. In spite of great antagonism to the statement, a great many cases of tuberculosis on record might be traced fairly to infected milk supplied to children. Dr. Walker cited the work of MacFadyen and Macconkey in demonstrating that the mesenteric lymph nodes from the bodies of children dead from other diseases than tuberculosis when injected into guinea-pigs produced tuberculosis in 25 per cent. of the cases, thus showing the frequency of infection of this chain of lymph nodes without other tuberculous infection.

Dr. A. C. Cotton read a paper on

WHAT IS DUKE'S DISEASE?

He was of the opinion that a great many cases in the epidemic had not been reported because of the atypical symptoms and the courses which they ran. If they were not scarlet fever and were another disease, Duke's disease, he thought that Duke's disease should be recognized as a nosological entity. He brought the question up to further a discussion on this point.

Dr. M. P. Hatfield said that he was as yet unconvinced of the reality of Duke's disease. He, too, had had many atypical cases of scarlet fever but several of them had been followed by typical complications.

Dr. F. S. Churchill regarded Duke's disease as merely a modified form of scarlet fever, and failed to find proof of the contention that it is a separate disease. He thought that discussion about it is a waste of time without fuller knowledge of the cause of scarlet fever.

Dr. VanDerslice thought that the importance of diagnosticating such a disease as Duke's disease was that it might prevent the hardship attendant upon the six weeks' isolation practiced for scarlet fever. This hardship is very great in poor families.

Dr. J. H. Hess had not seen anything which corresponded to the description of Duke's disease, although he had had many atypical cases of scarlet fever and had had 8 cases of typical scarlet fever in one family.

CASE OF CHOREA BROUGHT ON BY FRIGHT.

Dr. J. W. VanDerslice reported the case of a girl of eight years who had received a severe fall and fright, following which there was a rapid onset of choreic movements beginning in the mouth and fingers and extending to the whole four extremities and to the head. Deglutition was embarrassed and locomotion was impossible. She even could not sit up in a chair. When seen the facies was one of extreme stupidity, the tongue being thrust out and withdrawn or jerked from side to side constantly. The respirations were irregular; the knee jerks were absent. There was incontinence of urine and feces. Speech was lost and there were frequent fits of crying.

The patient was kept in bed for nine weeks and gradually recovered.

The patient came from a neurotic family, the father being a dipsomaniac, the mother neurasthenic, and one other sister precocious and hysterical. Dr. VanDerslice referred to the frequency with which choreics have a weak hereditary nervous system. He believed that this case was one of rheumatic infection, the fright having acted as an exciting cause, lowering the vitality of the child so as to allow of a very rapid development and dissemination of the diplococci or their toxins.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, June 11, 1907.

DAVID L. EDSALL, M.D., PRESIDENT.

DR. ALFRED HAND, JR., showed a child with Hodgkin's Disease. Dr. Hand also presented a patient with Vincent's Angina.

DR. SPEESE showed a patient of interest in connection with Dr. Hand's case. The child had cervical adenitis, which had persisted for three months, enlarging rapidly, and involving almost the entire right side of the neck. The diagnosis lay between Hodgkin's disease and tuberculosis, the latter diagnosis finally being decided upon.

DR. JOPSON said that the diagnosis of tuberculosis had been made in Dr. Speese's patient, though the location and the extent of involvement are not those commonly seen in children with cervical adenitis. The points leading to this diagnosis, as against that of Hodgkin's disease, were the involvement of only one glandular area, the character of the swelling, the fact that a number of the nodes were becoming fused, and that two or three were breaking down and evidently contained pus. There was flatness over the corresponding apex of the lung and some increase in vocal fremitus, without much change in the breath-sounds. The course of the affection of the nodes was different from that ordinarily seen. There is no enlargement of the tonsillar node, which is the first to be involved in cases of infections coming by way of the tonsil, and no enlargement of the glands posterior to the sternomastoid, which are usually the first to be involved in infections coming by way of the retropharyngeal lymphatic route. Dr. Jopson thought it might be an infection of the supraclavicular glands from below upward, following primary tuberculosis of the apex of that lung, and said that the glands were to be removed in the course of a few days.

DR. J. DOUGLASS BLACKWOOD demonstrated Specimens of the Spirillum of Vincent's Angina, and of the Spirillum of Noma.

Dr. J. H. L. McKee showed a patient with Mongolian Idiocy.

Dr. J. Claxton Gittings reported a case of

SUBCUTANEOUS EMPHYSEMA FOLLOWING EXPLORATORY PUNCTURE OF THE CHEST.

He called attention to the fact that the medical student is not sufficiently warned of the possible dangers attending paracentesis thoracis. Several instances of fatality in children following the insertion of the needle have been reported. In one of the author's three cases a localized pneumothorax followed puncture, and in all a subcutaneous emphysema developed, lasting from five to eight days. In one case air escaped through the needle, and was followed at once by pronounced shock and hemoptysis, necessitating rigorous stimulation, but, fortunately, without fatal result. The emphysema, *per se,* seemed to cause no ill effects, but the pneumothorax was a distinct factor in adding to the discomfort and danger.

The conditions rendering injury to the lung easy were probably the proximity of a consolidated lung to the chest wall, and adjacent adhesions, making the lung less mobile and limiting the pneumothorax. Allowing for the necessity of puncture in many cases, it would seem that greater care in physical diagnosis might obviate it in others, and in no case should it be undertaken without due regard being paid to the possible contingencies.

(This case is reported in full on page 20.)

Dr. Miller said that he punctured the chest of a child one day, and it immediately spat up some blood. An adult, who did not have any fluid in the pleural cavity, had a convulsion during paracentesis, but quickly recovered from it.

TETANUS NEONATORUM.

Dr. R. O. Clock (by invitation) reported a case of tetanus neonatorum. (See page 25.)

PULMONARY GANGRENE IN YOUNG CHILDREN.

Dr. D. J. Milton Miller read a paper with the above title, reporting the case of a child of two years, who recovered without complication.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. HENRY HEIMAN. DR. G. R. PISEK.
DR. J. HOWLAND. DR. S. W. THURBER.

PATHOLOGY.

HASENKOPF AND ROTHE: THE GERM CARRIER IN DIPHTHERIA. (*Jahrbuch für Kinderhk.*, October 7, 1907, p. 365.)

The occurrence within a short time of 4 cases of diphtheria in the Cadet Institute at Potsdam led the authors to undertake a series of bacteriological examinations. The throats of the inmates, 185 in all, were examined for diphtheria bacilli. Klebs-Löffler bacilli were present only in the throats of the convalescents, and not in those of the other cadets. In 40 cases bacilli were found which in their cultural growth resembled the Klebs-Löffler bacilli. Microscopically, these bacilli were short, plump, and thickened at one end or in the middle. They had a radial or parallel arrangement, and stained with Gram. With Neisser's stain the characteristic granules seen in Klebs-Löffler bacilli were not present. Even in large doses the bacilli were not pathogenic for guinea-pigs.

The Klebs-Löffler organism is not ubiquitous. Complete isolation of the patients is urged, especially where children are exposed to the disease. HENRY HEIMAN.

MEYER, LUDWIG F.: CAUSE OF DEATH IN CONGENITAL PYLORIC STENOSIS. (*Monatsschrift für Kinderhk.*, May, 1907, p. 75.)

On the basis of 3 fatal cases, the author denies the generally accepted assumption that death in congenital pyloric stenosis is due to the persistent vomiting and the consequent starvation. In the first case, improvement followed the use of fat-free breast milk. However, soon after natural breast milk was given, the infant developed symptoms of alimentary intoxication accompanied by glycosuria. Death followed in a few days. The second and third cases likewise gave evidence of intoxication immediately before death occurred. In all the 3 cases the infants recovered from the original disease, *i.e.,* the stenosis, but succumbed to a form of intoxication. The loss of tissue, probably a form of demineralization, leads to disturbed function of the processes of nutrition.

Death in these cases is, therefore, often an indirect, rather than direct, result of inanition.

These observations teach us not to give an insufficient amount of food for any length of time, and to resume ordinary diet gradually after vomiting has ceased. HENRY HEIMAN.

NAZAROV, I. S.: THE PRESENT STATUS OF THE QUESTION OF FREQUENCY OF PRIMARY TUBERCULOSIS OF THE INTESTINES IN CHILDREN. (*Ruski Vratch,* August 18, 1907, p. 1,061.)

The author states that primary tuberculosis of the intestines is more frequent than we are led to believe. He accounts for this by improper methods of gathering the statistics, and offers the following plan as one leading to correct results: (1) They should be divided into groups according to their ages, especially from one to fifteen years. (2) The statistics should embrace only those cases which died of diseases other than tuberculosis. (3) Cases in which the primary character of the intestinal infection can be proven without a doubt can be included. Data obtained from a voluminous literature by Nazarov (and following the plan outlined above) show that the disease occurs in 12 per cent. of all cases from one to fifteen years of age.

G. R. PISEK.

MEDICINE.

GOODALE, J. L.: THE EXAMINATION OF THE THROAT IN CHRONIC SYSTEMIC INFECTIONS. (*Annals of Otology, Rhinology and Laryngology,* March, 1907, p. 79.)

This paper is a plea for the more general recognition of the importance of the throat as an entrance of infection. It is limited to the consideration of tuberculosis of the lymph nodes and to infectious arthritis, and 9 cases are cited (all in children between the ages of two and nine years) in which there were enlarged tonsils and adenoids which were removed and inoculated into guinea pigs, producing tuberculosis. With some of these cases, the enlarged tonsils were associated with cervical adenitis. This may or may not disappear after the tonsils are removed. The article concludes with a discussion of the penetration through the tonsillar tissue of germs, their toxins and other matter in the form of dust, etc. This subject has been investigated by a number of men and definite results as to the paths of infection are much to be desired. S. W. THURBER.

KUHNER, DR.: ENURESIS NOCTURNA. (*Der Kinder-Arzt.*, December, 1906, p. 265.)

The causes are placed by Kuhner into four groups: (*a*) Those due to reflex origin, (*b*) those due to local excitation, (*c*) constitutional, and (*d*) psychological.

The treatment recommended combats the etiological factor by position in bed, cleanliness, or operative interference for reflex causes or local excitation. He warns against the futility of punishment in those due to constitutional causes, as imbeciles, idiots, etc. Hysteria, under the psychological group, is important to recognize, and this is often done by the prominence of some one symptom, as, for example, aphonia or weakness of one arm. Children with a neuropathic disposition are helped out of this class by a well ordered mode of life.

Bladder tone is improved in general by cold baths, massage and epidural injections of salt solution in the bladder segment of the cord; to the latter operation, which is painful, the author ascribes success to the cases which are of a suspicious hysterical character. He urges a systematic examination of the genital tract for foreign bodies, especially in obscure cases. G. R. PISEK.

THIEMICH, M., AND BIRK, W.: THE SUBSEQUENT DEVELOPMENT OF ECLAMPTIC INFANTS. (*Jahrbuch für Kinderhk.*, January 9, 1907, p. 16.)

Infantile eclampsia is defined as a condition characterized by the occurrence of repeated attacks of epileptiform convulsions of short duration, accompanied by loss of consciousness and signs of spasmophilia in the interval. These signs are laryngeal spasm, Trousseau's sign, the facial phenomenon, and galvanic hyperexcitability of the nerves.

The authors studied 64 cases, 54 being eclamptic and 10 showing only laryngeal spasm. Of these, 33 reached the school age. The severity of the disease has no influence in the subsequent development of the children. Two-thirds of the cases showed either physical or intellectual abnormality. Heredity seems to play a marked influence. In 37 per cent. of the cases eclampsia was present in other members of the family, and in 13 per cent. the parents were neuropathic. Eclampsia bears no relation to epilepsy in the parents. The authors attribute infantile eclampsia to a congenitally defective nervous system, the result of inherited weakness. HENRY HEIMAN.

GUIDES, E. J.: TYPES OF MENINGITIS AND QUINCKE'S LUMBAR PUNCTURE. (*Archiv. für Kinderhk.,* Vol. XLVI., 1-2, Heft, p. 123.)

The author describes in detail personal cases illustrating the difficulty, and even impossibility, of making a diagnosis without lumbar puncture.

He also discusses at length the characters of the fluids obtained from different varieties of meningitis. Finally, he gives personal cases illustrating the beneficial effects of puncture upon meningitis, and advises that it be employed as a routine therapeutic measure. J. HOWLAND.

TOBLER, L.: CONGENITAL MUSCLE ATONY (MYATONIA CONGENITA, OPPENHEIM). (*Jahrbuch für Kinderhk.,* July 8, 1907, p. 33.)

This is a very rare disease, as the author found only 15 cases reported in the literature besides the case of his own. It was first described by Oppenheim in 1900. The author's case was one and one-half years of age at the time of the first examination. The parents noticed the peculiar movements of the child almost from birth. At the time it was first seen it could not walk, or even stand. There was marked atony of the muscles of the extremities and trunk, but no visible atrophy. Active movements were very feeble. The joints were lax, permitting of marked hyperextension. The knee-jerks were absent. The electrical reaction was unchanged in character, but much diminished. On subsequent examinations no noticeable changes in the condition of the muscles were found. The child died about two and one-half years later of a bronchopneumonia. No autopsy was obtained.

The disease occurs in both sexes. Hereditary influence, birth traumata, and premature delivery are of no etiological moment. The mothers occasionally remark that the fetal movements are feeble. Soon after birth the child's inactivity is noticed. The movements are very slow and feeble, yet coordinated. On palpation the muscles are found to be flabby and doughy. The muscles of the extremities are most frequently affected; those of the face and sphincters almost never. Sensation is normal, likewise the vasomotor system. The intelligence is normal and there are no subjective symptoms.

The affection is not progressive; the symptoms become less marked if the patient survives the period of infancy. The muscles of the upper extremity may recover entirely.

The affection is to be differentiated from poliomyelitis by the history, the absence of atrophy, site of paresis, and electrical reaction; from pseudoparalysis (as it occurs in rickets), by the absence of skeletal disease, and the slow course.

Treatment is by the usual electrical and mechanical measures.

HENRY HEIMAN.

SURGERY.

MATHEWS, PAUL: TUBERCULOSIS OF THE MIDDLE EAR IN CHILDREN, WITH SPECIAL REFERENCE TO ITS OCCURRENCE AS A PRIMARY LESION. (*Annals of Otology, Rhinology and Laryngology*. June, 1907, p. 390.)

By middle ear, the author includes the eustachian tube and the mastoid antrum. Chronic otorrhea in strumous children should make us suspicious of the nature of the discharge. If tuberculosis of the middle ear is primary, it must be regarded as a case of respiratory infection rather than that of alimentary infection, and that many children suffer from tuberculosis of the middle ear while at the breast is a strong point in favor of the theory of respiratory infection. To produce tuberculous lesions of the middle ear, the bacillus must gain access by one of the following paths:—

(1) Air passing up the eustachian tube, thus conveying bacillus.

(2) Infection spreading via eustachian mucosa.

(3) Infection spreading via lymphatics from lesions elsewhere.

(4) Infection carried by blood.

(5) Infection from external ear.

Practically, most cases fall under heads 2 and 4.

The tubercle bacillus is rarely found in the discharge. In making a diagnosis it is necessary to get some scrapings from the site of the disease. Absence of pain, loss of hearing and rapid destruction of the drum membrane are important points to keep in mind.

To obtain an adequate idea of this interesting subject, it would be necessary to refer to the original article of 35 pages.

S. W. THURBER.

HYGIENE AND THERAPEUTICS.

RICHARDSON, HUBERT: ARRESTED MENTAL DEVELOPMENT. (*Medical Record,* April 13, 1907, p. 604.)

Richardson believes that in a large proportion of those mentally deficient, the etiological factor is of postnatal origin, and that it should be sought for, and, if possible, remedied. Acute diseases affecting the thyroid, defects of assimilation and metabolism, circulatory defects and affections of the special senses are regarded by him as the factors to receive attention in the postnatal cases. Where the development has been retarded by antenatal conditions produced by disease of the mother, the liver should be freed of the maternal toxins. G. R. PISEK.

FLATAU, G.: THE MANAGEMENT OF NERVOUS CHILDREN IN SCHOOL SANATORIA. (*Die Therapie der Gegenwart,* December, 1906, p. 572.)

Flatau makes a plea for proper management of nervous children in school sanatoria. These children are the offspring of alcoholic or neurotic parents, or those who have been sexual perverts, or whose environment has been radically improper.

He distinguishes as suitable the following types: (*a*) Those children who are easily exhausted, who are constantly pale and have headaches; (*b*) those underdeveloped children with marked anemia, asthenia, emaciation and irritable nervous systems; (*c*) those who are too excitable and energetic; who are talented, but cannot fix their attention.

He further states that those types merge one into the other, and it is hard to say where one begins and the other ends. The remedy is school sanatoria, which will supply the demands of child life; instruction in small selected groups, few hours, many recesses, proper diet, baths, massage and the afternoons spent out of doors in garden work. G. R. PISEK.

BAGINSKY, ADOLF: TREATMENT OF ACUTE CARDIAC AFFECTIONS IN CHILDHOOD. (*Medical Record,* April 13, 1907, p. 589.)

Of all the children admitted in one year to this service Baginsky had 2.6 per cent. of cases with cardiac involvement, and he desires to bring these cases to the attention of the general practitioner who he says sees these cases only sporadically. In this paper he gives a description of the course and treatment of the acute forms only. Acetylsalicylic acid and ichthyol ointment locally are recommended in rheumatic cases, with an ice bag to the heart. In cases cited with pericardial effusion, he gave a dram of a solution of potassium iodid (3:100) every three hours, and inunctions with 1 gram of mercurial ointment three times a day, and soluble digitoxin ½ c.c. twice a day. He does not recommend abstraction of blood in cardiac cases. He believes that exploratory puncture of the pericardial sac is indicated in large effusions. Paracentesis of the chest should precede this measure if fluid is present in the pleural cavity. Vesicants over the cardiac area are unqualifiedly condemned. Diuresis is provided for by alkaline mineral waters, reserving the stronger diuretic measures for extreme cases. G. R. PISEK.

ULLMANN, E.: SUCCESSFUL USE OF DR. MARMOREK'S ANTITUBERCULOSIS SERUM. (*Wien. Klin. Woch.,* 1906, No. 22.)

In 7 cases of bone, joint and gland tuberculosis treatment with Marmorek's antituberculosis serum used by Ullmann, it gave him excellent results. The patients were respectively four, seventeen, ten, eight, thirteen, twelve and twenty-two years of age. Only one child developed colitis. The use of guaiacol-iodoform injections with Marmorek's serum appeals to Ullmann as the best and most successful treatment of bone, joint and gland tuberculosis.

(*Der Kinderarzt,* April, 1907, p. 85.) G. R. PISEK.

ARCHIVES OF PEDIATRICS.

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Original Communications.

PNEUMOHYDROTHORAX IN A BOY TWO YEARS OLD.—RECOVERY.*

BY FRANCIS HUBER, M.D.,
New York.

"With the possible exception of gas in the pleural cavity from the decomposition of exudation, pneumothorax always results from perforation of the pleura and entrance of air through the opening."

The view held by authors in former years that gas is sometimes secreted by the pleura is no longer entertained at the present time, though several excellent authorities—Senator, Biermer and Weil—claim that gas may exceptionally develop in the pleural cavity from decomposition. More recent observations have demonstrated the presence of gas-forming microorganisms in a few instances.

The air gains entrance to the pleural cavity by perforation, either from diseased conditions in the organs within the chest or through the thoracic walls.

The most frequent cause is the presence of an ulcerative tuberculous focus immediately beneath the pulmonary pleura. Ninety per cent. of the cases are due to this factor. Among the other causes may be cited perforation of an empyema into a bronchus, the giving way of a gangrenous process in the lung, rupture of a pulmonary abscess or hydatid cyst, bronchial ulcerations in connection with bronchiectasis or foreign bodies and rupture of a subpleural emphysematous vesicle.

Severe paroxysmal coughing, excessive vomiting spells, or any violent effort which increases the intrathoracic pressure may precipitate a rupture of the weakened pleural surface and thereby admit air to the pleural sac. On the other hand, a study of the literature reveals several cases in which the ulceration of the pleura was insidious and perforation may take place in the absence of any violent respiratory action. It has even occurred during sleep.

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* Read by title before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 7, 1907.

Trauma of the thoracic walls, stab wounds, fracture of ribs with laceration of the pulmonary pleura, or severe chest injuries without any external wound or fracture may give rise to this condition.

Within the past three years the writer has seen in consultation 3 cases in which the accident followed the employment of the exploratory syringe in suspected cases of empyema. One of these was complicated by an extensive emphysema of the subcutaneous tissue involving one side of the chest and extending upward above the clavicle. Fortunately no effusion followed and the patient recovered under palliative treatment.

To quote from the *American System of Practical Medicine*, Vol. II., p. 310: "An uncommon but exceedingly interesting and important form has been termed 'accidental'; it is characterized by occurrence in apparently healthy individuals and by a usually favorable course. While cases apparently accidental are often due to a latent tuberculosis, it is now definitely conceded that pneumothorax is occasionally caused by the simple rupture of a healthy or, more frequently, emphysematous lung."

Holt refers to the occurrence of the pathological condition in children, in a few brief words, as a complication in tuberculosis.

Jacobi makes a few general remarks.

In Carr's *Practice of Pediatrics* we are told "this is a rare disease in childhood, since phthisis, which forms the common cause in adults, is of uncommon occurrence in children."

Rosenbach's excellent article in Nothnagel's work is well worthy of study.

Netter, in *Grancher and Comby* (third volume), comments upon its rare occurrence in early age.

In the *American System of Practical Medicine*, Vol. II., p. 311, we are told pneumothorax is rare in children. It oftenest originates in a bronchopneumonia from the rupture of small superficial abscesses, such as the French have termed *vacuoles*. Rilliet and Barthez assert that pneumothorax from this cause is not so infrequent in children under seven years.

Pneumothorax is almost invariably followed by pleurisy, usually limited to the affected side. The effusion is sero-fibrinous in perhaps two-thirds of all cases (Netter, West, Senator, Weil).

As is evident from what has been said, pneumohydrothorax is not a distinct disease; it is secondary to, or a complication of, some pre-existing pathological state. For clinical purposes we can safely, then, assume the existence of a channel of communication between the pleural cavity and the atmospheric air plus a secondary pleurisy with effusion.

Max M., two years old, Russian and Polish parentage, was admitted to Beth Israel Hospital March 6, 1907.

Family history negative; is the sixth child; no accident at birth; breast fed for one year; after this received articles from the table. Dentition began at fourteen months; walked when twenty-one months old; appetite good; bowels regular; surroundings poor.

Was reported to have had measles when a year old, followed by pneumonia; one month later was said to have had a second attack lasting twelve days. With the exception of an injury to head, due to the falling of a section of a bedstead three weeks before, and which was not followed by any serious consequences, he had been in fair health.

About two weeks prior to admission he had a sudden rise of temperature, vomited a little, was constipated, and after four days' illness seemed to be in fair condition, though somewhat restless at night.

The present illness of six days' duration began with fever, followed in a few hours by vomiting, which recurred several times daily until admission. It was claimed that everything was rejected. Cough was present from the first, attended with yellowish expectoration. The attacks recurred at frequent intervals, and at times were followed by vomiting. Dyspnea present from the beginning; no cyanosis; patient greatly prostrated; no sweating; stools greenish and offensive.

General condition of the child good. Skin hot and dry; marked dyspnea present; no cyanosis or eruption upon skin.

Ears, nose, mouth and throat negative; cervical glands palpable, neck not rigid.

Chest.—Left side measured one inch more than the right. Over left lower lobe there was flatness, with distinct bronchial breathing and diminished fremitus. Above those were fine pleuritic friction sounds.

Anteriorly, over the precordial region, resonance in place of the cardiac dullness. Amphoric breathing and metallic tinkle present laterally, more pronounced upon coughing. Coin sound readily elicited. Pleural and pleuropericardial friction sounds distinctly heard.

In sitting position dullness was noticed in the precordial region with obliteration of Traube's semilunar space. Amphoric breathing less distinct and heard higher up. Succussion present.

Change in the patient's position produced a decided variation in the line of dullness. The shifting in the flat area was immediate, pronounced and characteristic.

Right Lung.—Exaggerated breathing, otherwise normal. In differentiating between simple effusion and effusion plus air, no difficulty need be encountered if we remember the *two physical signs* absolutely distinctive of the presence of pneumohydrothorax: (1) A strict horizontal upper line of flatness, whatever position the patient may take, there being no resisting lung to hinder the fluid from assuming immediately, and under all conditions, an absolute hydrostatic level. (2) An immediate change of this level of flatness with every change of position. These signs are all the more readily noticeable on percussion because of the marked contrast between the flatness of the effusion and the hyperresonance above.

Heart greatly displaced; apex beat just within line of right nipple; left border about middle of sternum; sounds of fair quality, regular about 160; no murmur. On sitting up, cardiac dullness shifted to left about one and one-half inches.

Spleen palpable; no abdominal distention.

WHITE BLOOD CORPUSCLES.

	March 7, '07.	March 15, '07.	March 28, '07.
Number per cu. mm.	11,400	13,000	15,000
Small mononuclear	12. %	6. %	17. %
Large "	7.5%	16.5%	23.5%
Transitional	1.5%	2.5%	...
Polynuclear neutrophile	78.5%	74.5%	57. %
" eosinophile	...	.5%	2. %
Mastzellen	.5%	...	.5%

Chart No. 1 (page 86) shows P. R. and T. for first week after admission to hospital. The subsequent history is briefly as follows:—

March 13th.—Gradual improvement in every respect. Amphoric breathing but faintly heard upon deep breathing or crying. Numerous fine friction râles posteriorly above and below; pleuropericardial friction sounds distinct.

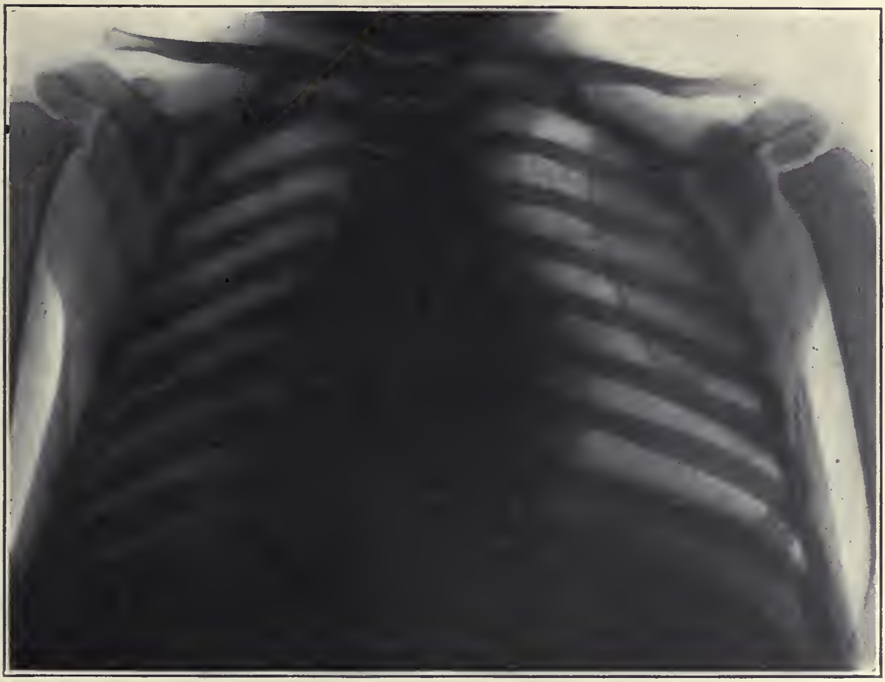
March 16th.—Heart less displaced.

March 20th.—Radiograph taken shows heart pushed somewhat to right, etc.

March 24th.—Improvement continues.

March 24th to April 2d, twenty-fourth to thirty-fourth day of disease, irregular temperature with increased pulse-rate and respiration. (Charts Nos. 2 and 3.) General condition satisfactory.

March 31st.—For the first time distinct pericardial friction sounds were heard.



RADIOGRAPH IN CASE OF PNEUMOHYDROTHORAX, SHOWING FLUID ON LEFT SIDE AND HEART DISPLACED TO THE RIGHT.

April 9th.—Improvement continued. Had gained in flesh and strength. Local signs improving slowly. Developed measles and was sent to the Willard Parker Hospital. The course was uneventful, and when seen, May 25th, he was in excellent physical condition. Breathing somewhat diminished on left side; few friction sounds still evident.

June 8th.—Radiograph taken by Dr. Hirsch showed slight shadow over left base due to thickening and adhesions. Enlarged bronchial glands visible to right of heart. Aside from an irritable cough, condition was satisfactory in every respect.

Because of the unusual character and the rarity of the pathological condition at this age, the case is reported at length. A few remarks only will be appended.

CHART NO. 1.

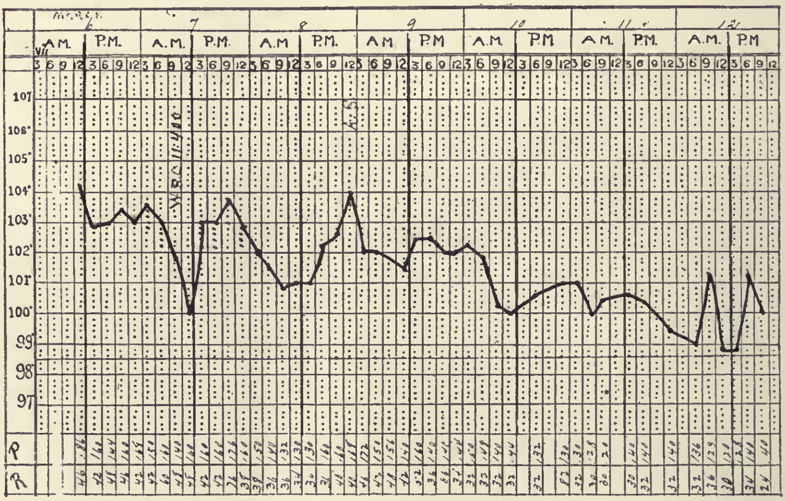
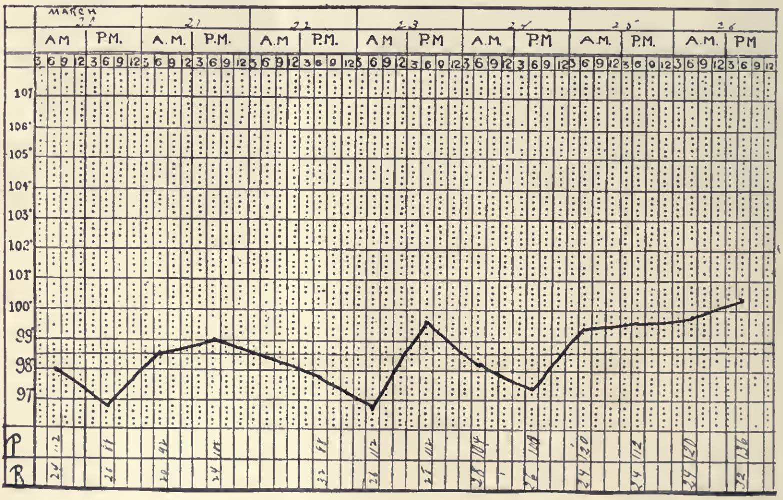


CHART NO. 2.



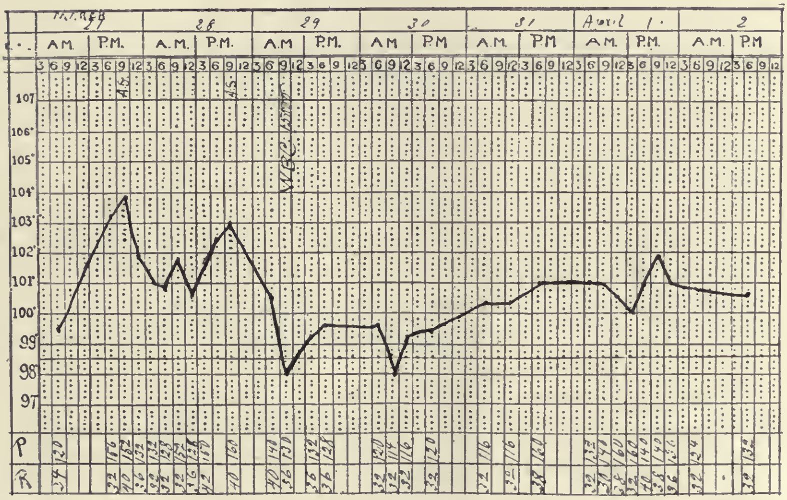
It is well known that pneumothorax may occur early in the course of tuberculosis, before the development of well-marked and characteristic symptoms. Our patient has been carefully watched. Repeated examinations of the sputum were made with negative results.

About the same time there were in the hospital in the adult service, 2 other cases of air and fluid in the pleural cavity as a complication of tuberculosis.

The course of our case was in marked contrast with the others, which rapidly went to a fatal termination.

It is to be regretted that, from a scientific point of view, no bacteriological examination was made of the fluid in the pleural cavity. The child was progressing favorably and therefore a puncture was not indicated. Furthermore, it is claimed that the perforation is probably open if a loud, amphoric, blowing sound is heard with respiration, or if both inspiration and expiration are accompanied by a metallic sound like the bursting of a bubble (Weil). This latter, however, is a very rare occurrence. In our case the amphoric breathing was very distinct; there was likewise metallic tinkle, justifying the suspicion that it was an open and not a closed or valvular type.

CHART NO. 3.



In view of these facts, it was feared that, if a puncture were made, a subcutaneous emphysema might follow and complicate matters.

This is not a theoretical objection, for the author knows of two instances in which the accident took place, necessitating a rapid incision with drainage. Both eventually recovered.

BLOOD-PRESSURE IN CHILDREN.*

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The frequency and the character of the pulse have been observed in health and disease for many years, but studies of vascular tension are more recent. Harvey (1619-1628), studying the blood, "began to think whether there might not be motion, as it were, in a circle." Following this idea he demonstrated the circulation of the blood, and how it was influenced by emotions, as pleasure or fear, by age and temperament, by the character of the vessels, whether straight or curved, etc. Harvey's writings indicate that he knew practically as much as is now known concerning the circulation of the blood. Young investigated the resistance in the capillaries, and Stephen Hales (1733) determined the blood-pressure by experiments on the horse. Vierordt, in 1855, introduced the sphygmograph.

Blood-pressure depends upon many conditions, as the energy of the ventricular contraction, peripheral resistance, elasticity of the arterial walls, and the volume of blood. The pulse-rate and pressure do not necessarily increase together.

The volume of blood and its quality stimulate the heart to strong or to weak contractions.

Increased abdominal pressure raises arterial pressure up to a certain point, but after that point is reached it causes a fall. A distended stomach by mechanical interference will affect the heart action as well as arterial pressure.

The area of the venous system is nearly double that of the arterial, and being more elastic the veins are able to hold nearly all the blood of the body—13 pounds in adults.

The arteries can maintain a blood-pressure of eight atmospheres, it is claimed, and increase of resistance means increase of pressure. The tone-pressure of the arteries is maintained by the vasomotor nerves having afferent and efferent fibers, and so influenced by many reflexes of remote origin. The tone center is located in the medulla.

The total end-pressure in small arteries is increased by dilatation because there is less friction to be overcome by the blood.

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* Read before the Section on Pediatrics, New York Academy of Medicine, October 10, 1907.

Stimulation of the centripetal nerves causes increased blood-pressure; so also does irritation of the cerebral cortex, *e.g.*, hemorrhage of the brain. High or low pressure is not the same in all the arteries at one time, there being general antagonism between the circulation of the internal organs and that of the skin. The carotid of the dog can stand twenty times the normal pressure, while the human carotid has ruptured at eight times the normal pressure. At high arterial pressure the distensibility is diminished. It is said that one-fifth of the blood-volume may be lost, and yet there be sufficient pressure to maintain life, because of the increase in peripheral constriction. If the blood-volume is reduced to half, convulsions and death will follow. Transfusion promptly raises pressure, even though the fluid be not blood.

As a rule, rise in frequency means rise in pressure. The normal pressure of the femoral and brachial arteries in man is between 100 mm. and 160 mm. Clinically, the radial arteries have about the same pressure as the aorta. In quiet breathing there is no variation in blood-pressure; but in deep breathing there is an extreme rise of pressure at the beginning of expiration. The tension of the vessels rises and falls with atmospheric pressure. This is noticed particularly in those of poor circulation, asthmatic and cardiac patients, who suffer more when the atmosphere is damp. Weak hearts also suffer at high altitudes because of the lack of surrounding pressure to give normal resistance to the capillaries. Dr. Cook, who ascended Mt. McKinley last summer, reports that the party suffered much from nose bleed. As this peak is 20,464 feet high we do not wonder. Muscular work raises pressure, as swinging a pick or riding a bicycle. The amount of pressure is gauged by the sphygmomanometer, of which there are many varieties. My observations were made with the Riva Rocci instrument, having a broad arm band, which is thought to be more accurate than the older narrow band. The surface changes in blood-pressure in the skin are noticed clinically without an instrument by observing the difference in color, as in blushing, when the blood rushes to the surface, or in fear, when the blood leaves the surface. Again, in the presence of heat—the sun draws the blood to the surface, while cold, constricting the capillaries, drives it away. Contrast sunburn with frostbite. We notice again the change of the circulation of the skin in the bluish and mottled color of those who stay too long in the water when bathing. Also cyanosis in asthma or valvular heart diseases. Blood-pressure varies with age and sex; the blood-pressure of men being about from 100 mm. to 145 mm., and in women 10 mm. less. In infants under two years of age the pressure is from 75 mm. to 90 mm. After fifty years of age the pressure is high because of narrowing of the vessels, and the tendency to increase in the viscosity of the blood. Such narrowing may be normal, but is often due to capillary fibrosis. In those of nervous temperament the pressure is high, as in hysteria, for example. There are diurnal variations sometimes amounting to 60 mm. The pressure is low during sleep. The effect of digestion on pressure is not yet decided.

Alcohol does not increase the pressure ordinarily, though it increases the pulse-rate. Tobacco, on the other hand, has the effect of increasing the pressure through its influence on the central and peripheral vasoconstrictors. Excitement increases pressure. Atmospheric temperature, if high, dilates the arteries; if low, it contracts them. The difference between systolic pressure and diastolic pressure may be from 25 mm. to 45 mm., though clinically we record only systolic readings.

High Tension.—In certain diseases the vascular tension becomes abnormal. It is said that any pressure below 100 mm. is pathological, and Kapsammeir says an adult cannot live with pressure less than 60 mm. In cases of cerebral compression vascular tension reaches the maximum, being 350 mm. to 400 mm. Pain causes hypertension, *e.g.*, biliary colic, peritonitis, and labor pains. In chronic inflammation of the kidney vascular tension is very great, as the vessels throughout the body are likely to be sclerotic.

Bright (1836) considered retained urea the stimulant that urged the heart and gave resistance to the vessels.

Autopsies show heart hypertrophy without vascular sclerosis, and the sphygmomanometer shows vascular tension before cardiac hypertrophy can be demonstrated. Certain infections cause high tension, *e.g.*, scarlet fever and epidemic meningitis.

Low Tension.—Hypotension is seen in wasting diseases, as phthisis, general paralysis, collapse after injury or typhoid fever, during anesthesia.

Purpura hemorrhagica causes low tension, *e.g.*, a man with great areas of hemorrhage registered 110 mm. at the time, but after recovery registered 128 mm. with pulse 78. In collapse the pulse becomes small and feeble, because the heart is ineffectual in driving the blood to the surface, large quantities being stored in the abdominal vessels because of the paralysis of the vasomotor nerves.

Experiments prove that fatal collapse at the height of these diseases is due to paralysis of the vessels and not to paralysis of the heart muscle. That is to say, while there is paralysis of the heart, it is not the cause of death. Temperature alone will not affect the mean blood-pressure. The dicrotic pulse of typhoid is not alone due to low blood-pressure; it is due also to the typhoid toxins. In nephritis a pressure of 200 mm. is not rare, but near the end of life the pressure falls. However, Henson found high tension in a nephritic patient who also had phthisis. Hypertension is a sure sign of a contracted kidney. Albumin or casts may be absent, and the specific gravity normal in urine of patients whom we know to have chronic nephritis. Insurance examiners now regularly take sphygmomanometer readings. In healthy men the femoral or brachial tension varies between 100 mm. and 150 mm.

From these general observations let us turn to the blood-pressure of children in health and disease. The following observations were made on 216 patients in hospital and private practice. The instrument used was the Riva Rocci with broad arm band. From these observations it is evident that the vascular tension is lower in childhood than in adult life. The averages are in health:—

3 years..	91 mm.	8 years..	101 mm.	13 years..	107 mm.
4 years..	89 “	9 years..	102 “	14 years..	110 “
5 years..	95 “	10 years..	112 “	15 years..	109 “
6 years..	96 “	11 years..	102 “	16 years..	117 “
7 years..	102 “	12 years..	111 “	17 years..	103 “

As cerebral hemorrhage causes so great vascular tension, it seemed of interest to compare hydrocephalus and microcephalus where the abnormal intracranial pressure is persistent.

A hydrocephalic girl of five years had a pulse of 110 and arterial pressure of 135 mm.; slight excitement may have raised these figures above her normal. Two adult hydrocephalics registered about normal, namely, 125 and 120 mm. The microcephalics all registered high.

2½ years........	pulse,	120	arterial pressure,	115
6 "	"	100	" "	110
9 "	"	98	" "	125
16 "	"	75	" "	130

Those familiar with idiots and feeble-minded persons know how poor is their circulation. Their hands and feet are purple and cold even in mild weather.

Seventeen little idiots were examined and exhibited pulse-rates and arterial pressure both rather above normal. Having no sense nor proper understanding, they were frightened by the examination notwithstanding our care. Probably the excitement explains the high figures, viz.:—

5 years............	pulse,	115	pressure,	115	mm.
5 "	"	106	"	100	"
6 "	"	125	"	90	"
7 "	"	120	"	105	"
5 "	"	112	"	110	"
7 "	"	105	"	114	"
4 "	"	90	"	94	"
9 "	"	90	"	98	"

A girl of eight years with cerebrospinal meningitis had a pulse of 140, temperature 100.5°, respiration 30, and blood-pressure of 115 mm., slightly high for her age.

A boy of seventeen years, with meningitis following mastoid disease and operation, had a pulse of 150, temperature 104.2°, respiration 36, blood-pressure only 98 mm.

One theory of the cause of epileptic convulsions is disturbance of the vasomotor center in the medulla. As epileptics have an uncertain circulation it seemed that the sphygmomanometer might indicate abnormality. Thirty-two patients were examined, but the variations from normal are very slight, only 2 to 9 mm. below my normal for each year. A boy of fifteen years with 130 mm. usual tension rose to 148 mm. during a fit. The effect of the epileptic seizure is the same as muscular exercise. Of cretins there are five. One sixteen months old with a temperature of 104° due to empyema had a blood-pressure of 76 mm.

Age counts for little in cretins, therefore the weights are given also:—

			Before Operation.	After Thyroid Grafting.
17 years,	8 years' weight,	50 lbs.	103 mm.	90 mm. pulse, 99 Temp., 101°
22 "	11½ " "	71 "	95 "	75 mm. pulse, 95
25 "	13½ " "	89 "	84 "	85 "
30 "	15 " "	97 "	105 "	

I have found no record of blood-pressure in cretins, and am especially interested in these, as Dr. W. S. Bainbridge operated upon 3 of them by thyroid grafting or implanting. In one instance there was a fall of 13 mm., and in another 20 mm. The third was practically unchanged. If the weight of these patients be regarded instead of their age, we find 2 up to the age normal and 2 very much below it.

A woman thirty years old, with a goiter before operation, showed 125 mm., and after removal of the thyroid gland only 105 mm. and a pulse of 90 instead of tachycardia. Such a drop is worthy of note.

Pneumonia.—Pneumonia was watched in 6 patients. One two years and two months old had a temperature of 103.5°, pulse 164, and pressure of 90 mm., high for that age. A girl of twelve years, temperature, 103.6°; pulse, 136; respiration, 44; pressure, 120 mm., also 10 mm. too high. A girl of fourteen years with temperature 105° showed 100 mm. blood-pressure. Four weeks later, when well, with temperature of 98°, the pressure was again just 100 mm. A child of four years with temperature 104.4° had a pressure of 100 mm.; at the crisis the temperature fell to 99.5°, but blood-pressure rose to 108 mm. After recovery it was 95 mm., normal for that age.

An idiot of five years had a temperature of 104°, with pressure 110 mm. Four weeks later the temperature was 99.4° with pressure 125 mm. These observations indicate that the complex of symptoms rather than blood-pressure must influence the choice of remedies.

Rickets is characterized by softness of bones and lack of muscular tone. The atonic condition is not apparent in the blood vessels, for the vascular tension seemed high rather than low.

3½ years..	118 mm.	3 years..	100 mm.	4 years..	90 mm.
3 " ..	100 "	3 " ..	85 "	2 " ..	80 "

Very fat subjects have high pressure; for example: a boy of sixteen years, weighing 125 pounds, had a vascular tension of 146 mm. Six subjects had valvular murmurs, indicating that heart disease occurs in about 3 per cent. of children.

A child of six years, with marked aortic obstruction, had pulse 96 with blood-pressure 110 mm., 14 mm. too high.

6 years: mitral obstruction; pulse, 85; pressure, 76 mm., 20 low.
8½ " " regurgitation; " 120; " 126 " 25 high.
11 " " " " 90; " 116 " 14 "
12 " " " " 108 " normal.
11 " " regurgitation and obstruction with hypertrophy; pulse, 120; pressure, 100 mm., normal.

The heart lesions show no uniformity, each case being a law unto itself. Nervous conditions give high pressure, as remarked before. A boy of five years with chorea illustrated this; while the movements were constant and marked he was kept in bed and his pressure was 135 mm. That fell to 124 mm. when he was up, and much improved as to movements—another example of muscular activity increasing the tension on the vessels.

Conclusions.—Blood-pressure in the young is low in proportion to extreme youth.

Its rise and fall are quickly influenced by emotions, as in adults.

Diseases of the nervous system give high pressure.

Acute diseases with high temperature may give either high or low pressure.

Sclerosis of arteries is almost unknown in childhood, so that the use of a sphygmomanometer for its detection is needless.

Blood-pressure readings are of interest physiologically, but have little clinical value in childhood. (Discussion on page 144.)

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HYSTERIA IN CHILDREN.*

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It is to the French school, and especially to Charcot, that we are indebted for the recognition of hysteria as a well-defined clinical entity; and to Lepois for first calling attention to the frequency of the condition during childhood.

From the Hippocratic theory of "vapors from the womb" as the cause of hysteria to our present recognition of the psychic sphere as being primarily at fault has been a great stride, yet our knowledge of the pathology of this interesting condition is still obscure. What is perhaps the strongest evidence of modern research as to the absence of organic changes has been recorded by Weir Mitchell and Spiller in their report of an uncomplicated hysterical tremor lasting thirty years, with postmortem examination.[1] It has been suggested that the phenomena of hysteria may result from an increased motility of the neurones.

Regarding the relative frequency of hysteria in childhood and adult life, Bruns[2] states that about one-fifth of his total cases of hysteria occur in children, this ratio agreeing with the earlier observations of Briquet.[3]

Cases of juvenile hysteria have been reported as occurring at two and three years of age, and 1 case at one and one-half years, but certainly we can say that hysterical phenomena in children are rare before the age of six years, and most frequent about puberty, when the nervous system is subjected to the strain incident to that period of life. Girls are affected more frequently than boys, but it is in the latter sex that we find the more severe cases.

Predisposing etiological factors are heredity, faulty environment, and education; any condition lowering the vitality, or any condition causing continuous irritation of the nerve centers.

Sheffield claims that acquired causes are more potent than heredity, and that the influence of the latter is much overrated, but I do not believe the clinical facts bear him out, and would place heredity as the most important factor. A cause emphasized by Bourneville is alcoholism of the parents. This I believe to be somewhat underrated as an etiological factor in hysteria and also in epilepsy. Prominent among exciting causes may be mentioned trauma, fright, violent anger and imitation. Thiemich mentions cases of hysteria in children in which the symptoms of a preceding organic affection are continued by autoimitation long after the original condition has returned to normal.

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* Read before the North Branch of the Philadelphia County Medical Society, February 19, 1907.

The symptoms of juvenile hysteria are essentially the same as in the adult, although subject to some modification.

Of sensory symptoms are observed pain, and all grades of increased and diminished, or even abolished, sensation. Anesthesia is a more infrequent symptom in the hysteria of childhood than is hyperesthesia, but under this head have been reported cases of hysterical blindness, hemianopsia and deafness.

Motor disturbances that may occur are paralyses, contractures, tremors, convulsions, and a peculiar disturbance of co-ordination—astasia-abasia. Of these, convulsions are the most frequent manifestation of hysteria in childhood, and tremors the least frequent.

Among visceral and vasomotor phenomena may be enumerated vomiting, tympanites, disturbances of respiration and of temperature.

Psychic symptoms are impairment of memory and will power (amnesia and aboulia), and the most characteristic impressionability or readiness of reaction to suggestion.

In a series of 92 American cases collected by Sheffield[4] no less than 27 different morbid conditions were simulated by the hysterical manifestations. Of these, convulsions were the most frequent (23), and spasmodic croup (11) the next in frequency. In this series no case of localized tremor was mentioned, and Lloyd also has called attention to the rarity of this form of hysteria in children.

The diagnosis of juvenile hysteria presents more difficulties than does the diagnosis of the same condition in adults, this being especially true of hysterical convulsive seizures. Convulsions, while the most common manifestation of hysteria in children, are also a common symptom during this period of life in other conditions. I would say that in general we must depend for a diagnosis upon the history of the development and course of the symptoms, the absence of an adequate cause for the condition simulated, the absence of symptoms pointing to a true organic lesion, and the presence of the so-called "hysterical stigmata." These stigmata represent certain of the sensory changes, and, briefly enumerated, are as follows:—Areas of cutaneous hyperesthesia along the spine, under the breasts and over the inguinal regions (the two last named being, as a rule, most marked on the left side), glove-like and stocking-like anesthesia or hypesthesia of the extremities, anesthesia of the retinæ causing contraction of the visual field, and anesthesia of the pharynx and conjunctivæ. Nor should we omit the choking sensation—the common "globus hystericus."

As there is no reason why a person afflicted with a true organic disease of the nervous system could not also at the same time have hysteria, it must be remembered that the presence of hysterical stigmata in a given case does not rule out the possibility of a more serious condition being present.

The prognosis of hysteria is much more favorable in children than in the adult, Steiner and Gilles de la Tourette taking an especially optimistic view of the outcome.

Treatment.—Suggestion in one form or another is of paramount importance in removing the symptoms, but we should never lose sight of the probability of underlying neuropathy, and should institute good hygienic measures, a simple and unirritating diet, and isolation whenever necessary to secure proper discipline. Sometimes much can be accomplished by gaining the intelligent co-operation of the parents, but it has been the experience of the writer that in the majority of the cases the parents and other relatives make the condition worse by excessive sympathy on the one hand or by equally detrimental punishment on the other hand. If the child is poorly nourished and under weight, rest methods and forced feeding are of value. If anemia is present, iron may be given. Bromides are often of distinct value, particularly when the psychic symptoms predominate. When hysterical symptoms develop in a girl at the age of puberty, before menstruation has been established, emmenagogues may be tried. Hypnotism as a therapeutic measure I only mention to condemn, as the experiments of Charcot, Babinski, Dercum and others have demonstrated that hypnotism is but an artificially induced hysteria.

Hysterical insanity is of infrequent occurrence in the adult, and quite rare in childhood. Indeed, any form of insanity, aside from the delirium, confusion, stupor group, is rare under the age of fifteen.

The following 4 cases represent some of the less common forms of juvenile hysteria:—

CASE I. *Hysterical Tremor.*—From the neurological dispensary of St. Christopher Hospital.

R. F., girl, age ten years. Was first seen at the hospital May 2, 1904, at which time she presented a coarse tremor of her right arm. This tremor was not constant, ceasing when her attention was diverted and recurring when her attention was directed to the arm. She stated that the "shaking in her arm" had occurred at intervals for one year, and was apt to become worse when she was excited. The child came to the hospital alone, saying that her mother had sick headache all the time and could not come with her.

No satisfactory previous personal or family history could be obtained.

The girl was very emotional, crying and laughing by turns while under observation. She was rather large and well-developed for her age, her palate arch was high and narrow, and her upper central incisors were widely separated. She presented the usual areas of hyperesthesia along the spine, under the breasts and in the inguinal regions. There was also marked contraction of both visual fields. At this time she denied ever having had a tremor of either leg, but upon her second visit to the dispensary sixteen days later a marked tremor of the right leg was noticed, similar in character to that of the arm. I believe this tremor developed as a result of the suggestion given her by my question about "leg tremor" at her first visit.

She only came under observation twice, so no further study of the case was made.

CASE II. *Hysterical Joint.*—From the neurological dispensary of St. Christopher Hospital.

E. G., boy, age thirteen years, seen first September 7, 1904. He complained that ever since a fall eleven months ago, while riding a bicycle, he has had spasmodic attacks of pain in the region of the right hip, which were liable to occur at any time, but usually between the hours of midnight and 4 A.M. He described the pain as being throbbing in character, and limped during the examination. From his mother we learned that while the boy was at play he would run as much as the other children, without limping or complaining of pain.

The previous personal and family history were negative.

Upon examination the child was found to be under weight, with pallor of the mucous membranes. No joint change or other lesion could be found. Areas of hypesthesia and hypalgesia, irregular in distribution, were found over the upper and lower extremities; these were quite marked and were the only hysterical stigmata obtained at that time.

Subsequently the patient came under the service of Dr. Dercum at the Jefferson Hospital, where the same diagnosis was made, following a negative report as to a joint lesion from the orthopedic department.

The mother made much of the boy's condition, had already been to several hospitals with him, and I suppose is still "going the rounds." Efforts to explain the true condition, and to secure the co-operation of the mother, were fruitless.

CASE III. *Psychic Type.*—From the neurological dispensary of St. Christopher Hospital.

M. C., girl, age thirteen years, seen first April 18, 1904. Her mother gave the following history: For the past two years the child has been very nervous, irritable, difficult to manage and easily frightened; she was very emotional and would change quickly from tears to laughter, or vice versa. At school she was fairly successful with her studies, but her teacher found difficulty in controlling her. She complained of no motor symptoms or subjective sensory symptoms. Menstruation had not been established.

Family History.—Both maternal grandparents died of cancer; one uncle died from "scrofula of the neck"; one aunt (maternal) has had nervous prostration for fourteen years. The patient's father was an alcoholic; one brother an epileptic, and one cousin (paternal) is insane. The mother had two miscarriages.

Upon examination the patient presented marked contraction of both visual fields, and hyperesthetic areas along the spine, under the breasts and in the inguinal regions. There were no gross stigmata of degeneration and no evidence of mental arrest.

CASE IV. *Hysterical Dyspnea.*—From Dr. Dercum's service at the Jefferson Hospital.

J. C., girl, age fifteen years, Russian, seen first January 31, 1906. She complained of shortness of breath and of pains all over her body, also of headaches. These symptoms, she said, had existed for one year, and she further stated that she was unable to walk up the steps at school on account of her difficulty in breathing.

The previous personal history was negative, except that menstruation had not been established.

The family history was negative, so far as could be learned.

Upon examination it was observed that the child would breathe regularly when her attention was held, but when undiverted she would have every few seconds a sudden, noisy, deep inspiration, followed by a forced expiration. Her heart and lungs were perfectly normal, but the patient presented the usual hysterical hyperesthetic areas, also conjunctival anesthesia.

The above cases represent four distinct types of hysteric manifestation, and present various points of interest.

Case I, hysterical tremor, is the most unusual, and of interest also on account of the presence of the degenerative stigmata, or, as Dercum prefers to call them, "signs of arrested development." Case II, hysterical joint, is not so infrequent, but of interest from a diagnostic standpoint. Case III is a good example of the psychic type, presenting neither motor nor subjective sensory symptoms. In this case the overwhelming neuropathic heredity makes the prognosis a grave one. The last case (IV) represents the visceral type, and recalls the cases of hysterical breathing reported by Reisman.

In closing, I wish to express my indebtedness to Dr. F. X. Dercum for the privilege of reporting Case IV.

1810 Tioga Street.

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MILK AND TYPHOID.—Five of the 21 cases of typhoid fever in the city of Harrisburg last month have been traced to a dairy in Susquehanna township, just a little north of town, which supplies the city with considerable milk. That is the finding of the Sanitary Committee. Only 2 of the 21 cases have been traced to water, the rest having originated in other ways.—*American Medicine.*

THE REST TREATMENT IN CHOREA.*

BY JOHN RUHRÄH, M.D.,
Baltimore.

I have been trying, at the Garrett Hospital, to find out the best methods of treating several diseases with which we have almost constantly to do, and especially to learn what is essential and what non-essential in the management of these conditions. Chorea is one of the diseases in which I have been interested, and the results of my treatment have been so uniformly satisfactory that I thought it might be interesting to make a note of the method used.

I shall not attempt to review the various medicaments that have been used in the treatment of chorea. Barthez and Sanné, as well as other writers, state that drugs given in the fifth or sixth week of the disease are much more liable to be effective than those given earlier, and they advance, as the cause of this, the fact that drugs have perhaps but little influence on the disease. Those given late will, therefore, coincide more nearly with the recovery and be more apt to be regarded as efficacious. Very few of the text-books of today lay sufficient stress upon the value of rest and what may be called the rest treatment in chorea. The practitioner is led to try drugs first, and the rest treatment only as a last resort, when the reverse should be the case.

A modified Weir Mitchell rest treatment is, in my opinion, the best means we have at our command today for the treatment of chorea. This is not a new idea, but one which needs emphasizing, as this method gives quicker, better and more lasting results than any other mode of treatment. Recurrences are, if I am not mistaken, less frequent in cases which have been treated in this way.

Two objects should be aimed at in the treatment: First, rest for both mind and body; and, secondly, and of no less importance, the increase in the weight of the child. This second aim has not received sufficient attention, and there have been recurrences and relapses in proportion.

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* Read by title at the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 9, 1907.

The technique of the chorea cure, as I have used it, is as follows: On admission, after a preliminary cleansing bath, the child is put to bed, no matter what the severity of the disease, and is kept in bed until the movements have ceased entirely and the patient has gained in weight. If the case is mild, the child is moved into the sun room during the day or part of it, but in the more severe cases more or less complete isolation is practiced. If the skin is rough and dry, daily warm baths are used until the skin has become normal. Sometimes the child is tubbed and sometimes merely sponged in the bed. Later a morning sponge is given. In exceptional cases, where the nutrition remains poor, massage is used once daily.

The diet is most important, and at first the child is put on a milk diet, from 3 to 8 ounces every two or three hours. This is continued for several days usually, until the child asks for other food or until the digestive organs appear to be in good condition. Then solid food is added and the amount increased until the child is on a full house diet with as much milk as it can take in addition.

The bowels are kept open. A dose of castor oil is given at the beginning of the treatment, and later either enemata or drugs used, as occasion requires. As a rule, the bowels soon become regular and require but little attention.

Internal medication is very simple. In the average case no medicine is required. If the tongue is coated, a few doses of dilute hydrochloric acid may be given for a few days. Iron in some form is indicated if there is anemia, and I have used Blaud's pills if the child was able to swallow a pill, and the solution of iron and manganese peptonate if it was not. I have not used arsenic in the cases under my care, but it has been used during the summer service. Apart from its action in anemic cases I have never seen any especial effects from it, and my little patients seem to do as well without it as they formerly did when it was used as a matter of routine. Salicyl derivatives have been used where there have been distinct rheumatic symptoms.

The effect of the treatment is very satisfactory. All the patients I have treated in this manner have improved rapidly with one or two exceptions. In the mild cases the movements cease almost entirely after two or three days' time, but may be elicited by exciting the child or by allowing him to be up and about. In average cases the movements stop in a week or ten days, and in the severer cases in from two to three weeks; but sometimes the movements cease almost as quickly in the severe cases as in the milder ones.

The patient is kept in bed until all the choreiform movements have disappeared, and the usual test employed is to have the child hold out its arms at full length with the fingers spread as widely apart as possible. If there has not been a gain in weight by this time, the child is kept in bed until it has gained. In most cases the movements cease and the child begins to gain in weight about the same time. After the child has been quiet and gaining for a week or ten days, it is allowed to be up and about the ward, but the period of time out of bed is carefully regulated, the time being gradually increased. If the child becomes nervous, or the movements return, it is put back to bed again. The gain in weight ranges from 3 to 6 pounds, and we usually aim to put about 5 pounds on the child during its stay in the hospital.

In the last 40 cases we have had only 1 case which was not cured, and that was a resistant case of hemichorea which was taken out against advice. One case, a boy of seven with marked mental deterioration, required ten weeks, but eventually made a good recovery. The shortest stay in the hospital was ten days, and the longest seventy-two days. The average was about thirty-five days. The reason for keeping them this long has been to prevent recurrences, and in this I think we have been very successful. Some of our cases have returned the following spring, but if a child went out fat and well, a recurrence has been exceptional.

THE TEMPERATURE OF NURSLINGS.—Nobécourt and Merklen (*Rev. Mens des Mal de l'Enf.*, August, 1907) have studied a series of cases to determine the normal temperature curve in nurslings. They find that the infant does not present the line of variation commonly seen in the adult, even in health. The infant has a monothermal temperature, with little variation in the morning and evening. This monothermal temperature is constantly found in normal infants at least up to the fifth month in life. Interference with this regular line betokens always a pathological condition.—*Interstate Medical Journal.*

REPORT OF A CASE OF SOCALLED CYCLIC VOMITING WITH HEPATIC INSUFFICIENCY.

BY E. W. SAUNDERS, M.D.,
St. Louis.

George v. W., aged two years, was brought to me on October 9, 1905, with a history of severe and repeated vomiting of two days' duration.

His previous history was as follows: In August, 1904, when he was ten months old, he was ill for about two weeks, the illness beginning with severe vomiting. His temperature reached 104°. A second attack occurred the following February, 1905. This illness was similar to the first, except that the bowels were loose. Each of these attacks, especially the second one, was followed by great exhaustion. A third attack occurred the last of June, 1905, also beginning with vomiting.

After this attack he would put his hands to his stomach and utter a single scream, but not subsequently cry, and when the pain was gone he seemed all right. The last of July he had another attack, the most severe of all up to this time. He began with pain in his stomach and vomiting and loose stools. Before this the odor of the stools was bad. His abdomen was hard and tense. For three weeks he was in a critical condition. When taken ill he was on a simple diet and was nursed twice daily. As he grew better the doctor gave him as a tonic Fowler's solution—at first 1 drop three times daily, then 2 drops, then 3 drops—given two weeks and stopped as long. He took it probably a month. He came home September 19, 1905, but did not gain, only holding his own for perhaps ten days. He then refused to eat for several days and had a severe diarrhea which was controlled finally, then it was difficult to move his bowels, until the morning he came to St. Louis, when his bowels moved, and the movement was so large that it was almost impossible to take care of it. The first day or two of the attack he lay in a stupor, and then the vomiting began. This, then, is the history of our patient up to the time of seeing him.

From this you will see that there were several possibilities: gastroenteritis, obstruction of bowels, arsenical poisoning (last attack). Also the enormous stool with marked enlargement (distention) of the abdomen as seen later might make one think of dilatation of the colon, especially *as he was always "troubled with constipation."*

Prior to his illness his diet was very simple—milk, stale bread, spinach, asparagus, apple juice, baked apple, soft boiled egg, and perhaps a little scraped beef—at any rate nothing out of the ordinary, but, rather, to the contrary, a strict diet on account of his previous trouble. The record of the two days is not complete, but points to severe and repeated vomiting, abdominal distress, with temperature of 99.4° going to 100.4° on October 8th and to 100.8° on October 9th, when he was brought to St. Louis and placed under my care.

He had vomited persistently and was alarmingly ill. I found a boy who continued to vomit in spite of most rational measures, whose appearance indicated grave depression, and who cried, or, rather, whined, incessantly for water, rocked his head from side to side and seemed to be miserable. So great was his distress and sleeplessness that at 3 P.M. he was given a hypodermic of morphine and then was given a high enema of normal salt solution with some somatose. He had utterly failed to retain anything—water, gastric sedatives or food—up to this time, but now retained about an ounce of soda water. The record shows that he vomited frequently on October 10th until 6:30 P.M., when the stomach was washed, after which he ceased vomiting. He was given a hypodermoclysis of normal salt solution. Nothing but apollinaris water and champagne was given by mouth, nutrient enemas being still resorted to. His temperature, which had been 99.4° to 100.4° went to 101° on October 12th. Nothing unusual is noted on records about movements until this day (October 12th), when the enema is said to have brought a dark green movement.

From October 12th to 14th he improved rapidly, taking chiefly egg-water and toasted cracker. On the 14th he returned home.

Careful physical examination revealed nothing abnormal. The urine was repeatedly examined for albumin, sugar, casts, and acetone, but none found. This, then, caused me to disregard cyclic vomiting for the time being, especially since after the attack was over I learned the boy had been taking Fowler's solution in large doses, hence concluded that it was probably an instance of arsenical poisoning. This conclusion satisfied me until another attack identical with the one above described came on and the boy was again brought to St. Louis March 23, 1906.

Before relating the salient features of this attack, the following, taken from his nurse's notes, may be of interest:—

"G. v. W., age two years six months. Appetite good; very playful. Slept eleven to twelve hours per day, including nap one and a half to two hours. Bowel movements normal every day for a month. Urinated frequently, always good quantity. Color good, cheeks rosy for six or seven weeks. Feet perspire very little lately. Gained in weight 6 pounds from October 16th to March 23d. For nearly two months child seemed to be in a very healthy condition, overcoming former difficulties. Diet consisted of cereals, broths, very small portions of meats each day. Top milk (about 8 per cent.) diluted two-fifths, 5 ounces at each meal four times daily. Dram of codliver oil three times daily. Bovinine, ½ dram thrice daily. Toast and crackers (often buttered) during past four weeks. Patient little restless two nights before taken sick. Some puffiness under eyes for some weeks."

This attack began March 23, 1906, 3:30 P.M., with temperature of 102°, the stools being of normal consistency, color and odor. The boy vomited "every little while," until 2 A.M. March 24th, when he had a rest for a time, but resumed vomiting and continued throughout that day until brought to St. Louis, when stomach was washed out with solution of sodium bicarbonate and vomiting ceased for three hours. The patient vomited again and continued very nervous, until stomach again washed out, at 2 A.M. the 25th, some soda solution being left in stomach, and chloral given by rectum. On March 25th the temperature was 99.8°, 99°, 99.4°. He was given at 4 P.M. some apollinaris water, also a hypodermic of morphine at 12 M., which had to be repeated at 5.55 P.M. Frequent enteroclyses of sodium bicarbonate solution were given and feeding was done by rectum. From the 26th to the 28th he was fed by rectum and given, by the mouth only, apollinaris, champagne and panopepton.

The uncontrollable vomiting, lack of fever and recurrence of attacks now led me to consider the question of recurrent vomiting. The urine was examined, but the first day after patient reached here did not show the presence of acetone. The next day it did, however. The urine was examined frequently, and two specimens showed acetone and diacetic acid and then these bodies disappeared. In one examination of the urine cystin crystals were found, but repeated examinations failed to show indican.

During this interval there was certainly no error in diet, no taking of arsenic, and no abdominal colic. The notes of the nurse show that following for three weeks after the March attack the temperature came up to 100° sometime during the day, and for two weeks previous to the next attack the temperature reached 99.4°, occasionally some days reaching only 99°. The next attack began at 4 A.M., April 27, 1906, when the child was two years and seven months old and seemed as well as usual. For the previous ten days the stools had been normal and the baby voided frequently until twelve hours before the vomiting began. The night before there was some suppression of urine. The face became flushed, the child was restless, then the face became pallid and vomiting began at 5:30 A.M. the 27th, and was repeated "every little while" until after the stomach was washed with sodium bicarbonate solution at 9 A.M. The vomiting not having ceased altogether the stomach was again washed at 7:30 P.M. The temperature was never over 99.2° that day. The same line of treatment was instituted: alkalies, enteroclyses and rectal feeding. The boy was nauseated, but did not vomit again until 8 A.M. the 28th, having had, however, nothing by the mouth but soda, magnesia and a little apollinaris. He was given three hypodermics of gr. $^1/_{48}$ morphine from 1:30 A.M. to 2 P.M., with no effect. He was so greatly depressed and apparently dangerously ill that I was sent for, but I being unable to go Dr. Johnson went. He continued the usual treatment, peptonized milk by the rectum, salt solution and alkalies. The morphine, as noted, not allaying the great restlessness (very like antemortem restlessness), gr. $^1/_{16}$ codein was given hypodermatically at 3:30 P.M. At 5 P.M. a warm bath. At 7:30 P.M. gr. $^1/_{12}$ codein hypodermatically and a little whey and barley-water with milk of magnesia were given. At 9:30 P.M. 2 grains of trional. At 11 P.M. 2 grains trional again with a little hot apollinaris toddy. Nothing seemed to act as a sedative. Finally, at 1 A.M. of the 29th, he fell into a more or less restless sleep, lasting until 6:30 A.M.

I need not review the remainder of these notes. He was greatly depressed, requiring strychnia and atropin, hypodermatically, but once well started (April 30th) made a rapid recovery. The urine during this attack was sent to St. Louis and found to contain acetone and diacetic acid. At no time was the temperature over 100°. If the stools were abnormal no record was made of this fact, and nurse and physician remember nothing abnormal—at any rate nothing striking. Before this attack his diet was quite rigid and he played out in the air much. He was taking Holstein milk, cream of wheat, barley, rice, oatmeal, egg every other morning, alternating with bacon, beef juice, scraped beef, toast, stale bread, graham crackers, etc.

In this, as in other attacks, he had uncontrollable vomiting —sometimes blood-tinged mucus—great depression, excessive thirst, irritability and insomnia.

On May 27th he had another attack in which the acetone odor of the breath (which I failed to say had been noted before) was this time the signal. This attack was not under my observation, but the record shows frequent vomiting, and the nurse says it was identical with his other ones. The temperature never went over 100°; the urine contained acetone. Early in June I was sent for hurriedly and, arriving at his home, found the condition one of intestinal indigestion which was thought to be possibly obstruction.

July 13th the boy had still another attack, the vomiting lasting fourteen hours. This was not under my observation, but the same nurse was with him, and advises that prior to this there was considerable abdominal distention. From this attack on the distention continued, even increased, vomiting occurred every day or so, and there was some fever, intermittent clay-colored stools and loss of weight. The local physician suspected malaria, and blood was sent here for examination, but no plasmodia found. The condition was growing worse and the boy was brought to St. Louis again August 6th. Dr. Johnson saw the boy first and was alarmed at the condition. The distended abdomen, loss of weight, and the now irregular vomiting made him fear tuberculosis. The urine contained a trace of albumin. Altogether, the situation was not bright. Everybody was getting discouraged.

However, I concluded, after Dr. Warfield found an appreciable leukocytosis and after other observations, that we would not consider tuberculosis until forced to, and, finding the stools absolutely colorless, I determined that whatever else there might be there was a condition of acholia, not a displacement of bile, for the skin was not icteric, nor were there any bile salts in the urine. The liver was not enlarged; if anything, diminished in size.

In the discussion along this line, Dr. Warfield suggested a trial of sodium glycoholate, and Dr. Johnson zinc sulphocarbolate. This was done, and 2 grains of the former with ¼ grain of the latter were given from this time on. The improvement was rapid and marked, and since that time our patient has not had any genuine paroxysm. On several occasions his breath and demeanor warned the nurse, but a purge and alkalies warded it off, which it had not formerly done. The boy is thriving, the nurse, who was found necessary for months, was relieved of her charge, and altogether there has been an apparent transformation in the life of the child.

I therefore report this case in detail, and especially with reference to hepatic insufficiency, so that others may work along this line if it seems at all applicable.

3003 Lafayette Avenue.

ALCOHOL AND THE INFANT.—Raoul Brunon (*Le Bulletin Médical,* May 15, 1907) draws a painful picture of the increase of drunkenness in France since spirits have been substituted for the wines of the country as a common drink. It has become the custom to give brandy and spirits to infants at the breast to make them sleep, and to children at their meals. The nurse takes spirits to increase her milk, and the pregnant mother to help the development of her child. The workman drinks brandy three times daily. The infant is poisoned before birth, cursed with the paternal heredity, and made a toper in childhood. Many children suffer as a result from skin and intestinal diseases, and the number of deaths is appalling. Nervousness, insomnia, bad temper, and constant crying are the results in young children. Older ones are the victims of tuberculosis, epilepsy and crime. Absinthe is the drink of the young man, and it is the cause of the majority of crimes among the young. The effect of this state of things is evident in the small number of children and the large increase in crime, as well as in the smallness of the race, evidenced by the necessity of reducing the required stature in the French army.—*Medical Record.*

REPORT ON THE MILK SUPPLY OF NEW YORK CITY, WITH RECOMMENDATIONS.*

TO THE HONORABLE GEORGE B. MCCLELLAN,
MAYOR OF THE CITY OF NEW YORK.

Dear Sir:—

In response to your letter of March 20th, requesting us to investigate the milk supply of New York City with a view to recommending such measures as may be required relating thereto for the preservation of public health, the Commission begs to submit the following report:—

The facts regarding the various sources of the city's milk supply from New York and adjacent states have been gathered by us; we have studied the conditions of the cattle and of the dairies, the methods of handling the milk at the farms, at the creameries, and in transit to the city. We have, furthermore, investigated the conditions associated with the wholesale and retail distribution of milk in New York, and, finally, the methods, the scope and the details of inspection which are carried out by the Department of Health, both in the country and in the city. The problems involved on account of tuberculosis among cattle throughout the districts from which the city's milk supply is drawn have been considered, as well as the possibility of tracing cases of typhoid fever and other acute infectious diseases carried by milk to their sources in milk-producing communities. We have sought information on the foregoing and kindred topics relating to the milk supply from the numerous agencies directly concerned in the milk industry and from those who are in various ways seeking to foster public welfare by thoughtful attention to the consumption and care of milk. We wish to acknowledge in this connection our appreciation of the suggestions derived from the recent public-spirited and earnest consideration of the subject by the Board of Aldermen, from Mr. Nathan Straus, from the Milk Committee of the Association for Improving the Condition of the Poor, from the Association for the Improvement of the Milk Supply of New York, from the Milk Commission of the Medical Society of the County of New York, from various state and government reports, and from the Department of Health of the City of New York.

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* Submitted to the Mayor by the Milk Commission, May 22, 1907.

Our first consideration related to the possibility of securing a sufficient and safe supply of proper raw milk and the suitable handling of this milk from the farm to the consumer. Attention to the many important questions involved in various methods of sterilization and pasteurization has followed; also, the use of skimmed milk in the city under proper safeguards has been considered.

Milk is a most important food because it contains the elements of nutrition in an easily digested form. Milk obtained from a healthy cow in a proper manner is wholesome and never a source of danger if it be kept cool and uncontaminated and be consumed within a limited time. Milk is, however, a substance in which most germs multiply rapidly under conditions favorable for their growth, so that, if it becomes contaminated in any way by germs which cause disease, it may be a most dangerous food. Milk may be harmful on account of its containing (1) germs from disease of the cow, such as tuberculosis; (2) germs introduced by the milkers or other handlers of the milk, such as those of typhoid fever, scarlet fever, diphtheria or tuberculosis, and (3) an excessive number of ordinary germs causing diarrheal diseases in infants. These contaminations may arise from dirty surroundings, from milking a sick or dirty cow, from milking with soiled or wet hands, from a milker who is sick or harbors disease-causing germs, or by the use of dirty utensils, or by contact with impure water, and may be increased by keeping the milk at a warm temperature favorable to the multiplication of these germs. These risks of contamination exist in many places. They may arise at the farms, during transportation to the creameries, at the creameries, during shipment to New York, and transportation in New York, in the stores where milk is sold, during delivery to the consumer, and while in the possession of the consumer.

The milk supply of New York comes from between thirty and forty thousand farms located in six states, some points of shipment being 400 miles from the city. At these points of shipment the milk is commonly delivered to creameries, where it is mixed, cooled and put into the receptacles, usually forty-quart cans, in which it is transported by railroad to New York City.

Present Board of Health Control.—It appears on investigation that general surveillance of the milk supply from outside of the city, especially proper icing while *en route,* was begun by the Health Department six years ago. Two years ago inspection of the numerous creameries which ship milk to New York was begun. One year ago the territory supplying milk to the city was divided into fifteen separate districts and one inspector was assigned to each district. Large notices printed on muslin for posting in every cow barn officially examined were furnished to the inspectors. These notices set forth certain regulations as to the care of cows, stables, water supply, the milkers, the utensils, and the milk, as well as recommendations which have been of value to intelligent, painstaking farmers. Also printed blank forms were furnished the inspectors, on which they were directed to report minutely to the Department of Health the conditions relating to the production and care of milk at each farm. Orders were then issued to the farmer giving directions for such changes as were necessary to make the premises and methods of procedure sanitary. We are informed by the Health Department that about 20,000 farms have been inspected as thoroughly as could be done with the inadequate force at hand, and that the necessary directions for care and improvement of these farms relating to milk production have been issued.

A few farmers ship milk directly to New York, but most of them deliver it to creameries. At these creameries the cleanliness and temperature of the milk received are noted by the inspector. A temperature of not over 60°F. is required on arrival at the creamery. The condition and operation of the creameries are kept more rigidly under surveillance than is possible at the farms. A muslin notice containing the regulations and recommendations of the Board of Health is affixed to the wall of each creamery; also reports on cards provided for the purpose are sent to the New York City office of the Board of Health, as is required at the farms. The 670 creameries now supplying milk to New York have for the most part been put in good sanitary condition.

The milk is usually transported to the city in refrigerator cars, proper icing being required. A milk temperature of not more than 50°F. is demanded on its arrival in New York, and also at all times thereafter until the milk reaches the consumer. The supervision of the milk at this stage is in charge of fifteen inspectors of the New York Department of Health.

There are in New York at the present time 14,107 stores in which milk is sold by persons who have complied with important printed sanitary requirements relating to its quality and care. These requirements or regulations are issued by the Health Department to all venders of milk in stores.

Such, in brief, is the outline of the supervision of milk now required and enforced by the Department of Health of New York City. It is evident that the system which has been adopted by the Health Department regarding the supervision of the milk is far-reaching and comprehensive. But the fundamental difficulty at the present time is the wholly inadequate resources available for the proper official supervision of milk at the places where it is produced, in transit, and during distribution.

The Commission believes that the essential requirement is to secure from the farm a safe, clean milk.

Tuberculosis.—The risk of transmitting tuberculosis through milk from cows to man is very slight, unless the disease in the cow is in an advanced form or is present in the udder. Even this slight risk is considerably lessened when such milk is mixed, as it generally is, with that of healthy cows before it is sold. We believe that this danger has been greatly overestimated in the public mind and that it can best be met by systematic inspection and condemnation of cows revealing tuberculosis on physical examination. Certain legislation regarding tuberculosis in cattle now being contemplated at Albany has been carefully considered, and the Commission believes that if suitable legislation can be secured with adequate appropriations for the enforcement of the same, our milk supply in this respect coming from the State of New York will be suitably safeguarded. Such legislation should provide for notification of city authorities of the existence of disease, which may be transmitted through milk, occurring in the cows or in the families or the persons of those handling milk.

Acute Infectious Diseases.—Protection against typhoid fever, scarlet fever, diphtheria and other diseases conveyed by employees at the farms and creameries at which milk is handled, is already provided by a regulation of the Health Department relating to the care and handling of milk. This regulation requires that the Department be promptly notified of the occurrence of such diseases. But the detection of such infectious diseases and the enforcement of the provisions of the Sanitary Code cannot be accomplished without adequate inspections of the sources of possible infection.

The questions involved in the transmission of disease through milk have seemed, therefore, to have been met most intelligently by the Department of Health of the city in so far as the appropriations for this purpose permitted. To secure a safe milk supply, it is of first importance to educate the farmers regarding the measures which alone make this result possible and afterward to see that the rules relating thereto are carried out, since for the most part the contaminating agents which render milk dangerous are introduced at the farm. The production of good milk demands that the farmers be educated so as to secure this result, and also that proper surveillance be exercised.

Country Inspection.—In order to have efficient inspection of the milk business, at least 100 inspectors for the country districts from which the supply is drawn, in addition to the fifteen now available, should be employed. From this number fifteen should be chosen as supervisors to act in such capacity as the Health Department may decide. Greater compensation should be given to this latter class on account of the higher rank of the work and greater responsibility which their official position entails. The work of the corps of inspectors should be twofold. First, to point out to the producers of milk the conditions under which safe milk can be furnished, and, second, to determine that these conditions are secured before the milk is permitted to be sold in this city. These inspectors should possess such kind of education and experience as will qualify them to work intelligently. They should be familiar with farming by experience, and in their selection preference should be given to men educated at good agricultural schools. They should be honest and possessed of good judgment and discretion. A certain proportion of them should be veterinarians and a certain proportion physicians, so that both the diseases of the cattle and those of persons concerned in the production of milk can be properly and effectively recognized and isolated.

It is recommended that a standard of equipment and certain prescribed rules of action relating to the collection, care and handling of milk for the use of those engaged in producing milk for sale in this city be adopted.

New York City Inspection.—In the opinion of the Commission, not less than twenty-five inspectors, in addition to the fifteen now employed, should be provided for inspection of milk in New York City; also five additional bacteriologists and five additional chemists, with remuneration adequate to secure men competent to judge promptly and thoroughly as to the character of milk, are required. No doubt an increased clerical force will be needed to carry on the work effectively.

Score Cards.—It is advisable that the dairies should be so graded in essential respects by a system of score cards, that there may be kept on file a record of the relative quality and safety of milk coming from different sources. Owners whose farms obtain a good rating should be able to secure a higher price for their milk.

Labeling Cans.—It is recommended that all cans and bottles used for milk should be labeled with the name of the farm or creamery from which the milk is shipped and the date of such shipment, so that it may be possible to trace to its source milk carrying infectious germs.

Milk Stores.—The sale of milk direct from cans should be permitted only when proper sanitary conditions exist at the place of sale. In grocery stores milk cans should be covered and kept in a covered receptacle, which should contain a proper amount of ice for cooling purposes. Score cards are likewise recommended for the rating of milk stores.

Skimmed Milk.—It is apparent that the necessary precautions required at the dairies to insure pure and wholesome milk are likely to increase the cost to the consumer. We believe that the sale of skimmed or separated milk (the sale of which is not now permitted in the city) should be allowed under such safeguards as an increased official scrutiny, through adequate inspection, will alone make feasible. Skimmed milk has a high nutritive value and should be cheaper than full-milk; consequently, its use may in a measure offset the increased cost of the latter, which a general improvement of the milk supply may entail.

Skimmed milk should be admitted to New York and be sold both at wholesale and at retail, but should be admitted and sold only in receptacles plainly labeled in large letters SKIMMED MILK.

Milk Depots.—It has been demonstrated that the high infant mortality in summer can be materially reduced by providing clean milk properly modified and pasteurized for feeding babies. In this respect the Straus Milk Depots have been of great value and such agencies should be perpetuated and might wisely be increased.

Care of Milk in Homes.—It is the opinion of the Commission that the Health Department can, in many ways, through its various means of official contact with the people both by word of mouth and by printed circulars, do very much to educate the people in the proper care and use of milk in the home. This work would not only result in benefit to those directly concerned, but would enable the Department to measure the benefits of the improved care of the milk supply and regulate accordingly the outlay directed to that purpose.

Pasteurization.—Notwithstanding after all safeguards that may be imposed by education and otherwise, there will be cases in which unsafe milk will be produced or offered for sale, and all such milk must be judged on its merits. The Commission, therefore, recommends that the Board of Health should, according to circumstances, require efficient sterilization or pasteurization of all milk which it finds unsafe for consumption as raw milk, on account of a suspicion of the presence of tuberculosis or other disease in the cows or unsanitary conditions of the dairy or a persistent high bacterial content. But in every instance milk so heated should be rapidly cooled to at least 40°F., and be put, after sterilization or pasteurization, into sterilized containers under aseptic precautions. The pasteurization of milk should be done only a few hours before delivery to the consumer, and the container should be marked with the time and date of pasteurization and the degree and duration of temperature employed for the purpose.

The Board of Health should make frequent bacteriological examinations of all pasteurized milk and should destroy such milk as contains more than 50,000 bacteria per cubic centimeter. It has not been thought incumbent upon the Commission to lay before you the details which have been gathered, but instead it has been deemed wiser to summarize briefly the conclusions which have been reached by a study of the situation of to-day, and to make such recommendations as seem called for by a judicious consideration of the milk supply of the city in the immediate future.

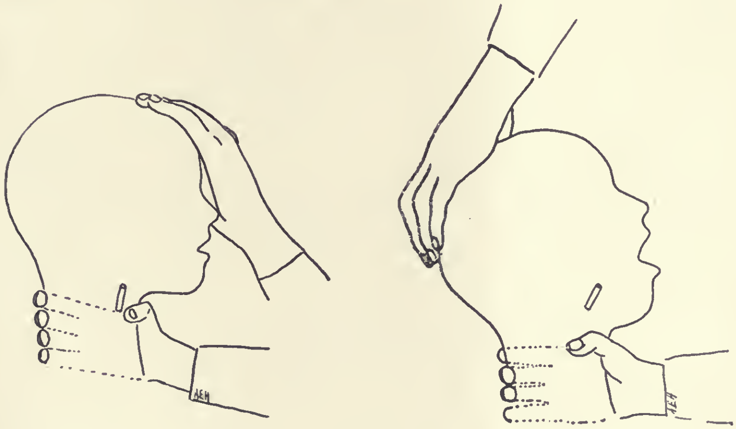
All of which is respectfully submitted.

(Signed) L. Emmett Holt, M.D.,
A. Jacobi, M.D.,
Joseph D. Bryant, M.D.,
T. Mitchell Prudden, M.D.,
Rowland G. Freeman, M.D.

DIGITAL METHODS OF EXTUBATION.

BY J. R. CLEMENS, M.D.,
St. Louis, Mo.

In France instrumental extubation has been practically abandoned. Bayeux, in his pioneer work, enucleated the tube by pressing the tube with his thumb against the vertebral column after the manner one squeezes a stone out of a cherry. The objections to this method were that it was painful and that it wounded the mucosa of the larynx. In contradistinction to enucleation, expression of the tube is now practiced by pediatricians where the force, instead of acting from before backward against the vertebral column, acts from below upward in the direction of the long axis of the trachea; in other words, in the plane of least resistance.

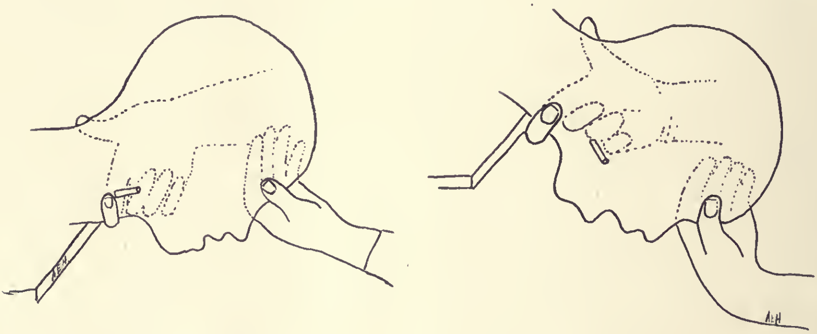


1. 2.

RENAULT'S METHOD.

Two methods of digital expression of the tube are in vogue in France—Renault's modification of Bayeux's method and Marfan's method.

Renault's Method.—The child is made to sit on the side of its bed while a nurse from behind pinions its arms closely to the sides of the body. The operator, kneeling on one knee and facing the child, embraces the head with his left hand (the thumb in front, the fingers on the occiput), while with his right hand encircling the child's neck (thumb in front, fingers on nape of the neck) he feels with the pulp of his thumb for the lower end of the tube, bending the head at the same time gently backward with his left hand. When the lower end of the tube has been defined the right thumb expresses it gently upward until it reaches the lower end of the cricoid cartilage. Without altering the relative positions of the hands the trunk is flexed on the thighs (the head remaining in the position of extension) and the tube, by the forward swing of the body, is thrown into the mouth, where it must be searched for with the fingers if the child keeps its mouth shut.



1. 2.

MARFAN'S METHOD.

This method Renault has employed in a great number of cases in 1904, 1905 and 1906 at the hospital Trousseau with almost constant success.

Marfan's Method.—The child is placed on a table on its abdomen in such a manner that the head and neck clear the edge of the table, while a nurse keeps the body and legs down on the table so that they do not slip forward. The operator supports the child's head with his left hand so that his thumb is on the right temporal fossa and his fingers on the left. His right hand embraces the neck, the thumb on the nape of the neck, the pulp of the index finger on the tissues of the sternal fourchette, the other fingers being folded in the palm. With the left hand the operator then bends the head gently backward, while with the index finger of his right hand he gently palpates for the lower end of the tube in the sternal fourchette. When this has been felt the head is gently flexed with the left hand as the tube is expressed upward into the mouth.

Since February, 1907, Marfan in his service has employed this method to the exclusion of instrumental extubation. He claims equal success with all makes of tubes, from O'Dwyer's to Froin's, and with all materials from which tubes are made, from vulcanite to metal.

Digital extubation may fail where the tube has been driven down too far by the intubator, or where ulcerations on the mucosa have bound tubes (long in place) to the mucosa.

The writer has experimented on twenty infant cadavers with Marfan's method of expression, and is convinced of its great value. Renault's method is inferior because the position of the operator is constrained, and the child is less under control. Besides, the pulp of the index finger is more sensitive than that of the thumb. Another objection to Renault's method is that the tube may be either swallowed or fall back into place in the larynx.

Marfan's method should be taught to all hospital internes and nurses who have charge of intubated cases. Its employment will, of course, depend on circumstances. The relation of digital expression to trauma has been investigated by Jules Glover. In ten infant cadavers on which he had performed digital expression of the tube, subsequent dissections failed to show any trauma of the mucosa of the larynx or trachea.

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SARCOMA OF THE KIDNEY.—In sarcoma of the kidney in early life hematuria seldom occurs, and, in fact, there is, as a rule, no alteration in the urine which would point to the serious nature of the disease in the kidney. The enlargement is painless, and beyond the steady growth of the tumor, and the gradual loss of flesh and strength of the patient, there are few symptoms to chronicle.—Mayo Robson, in *The Hospital.*

A FATAL CASE OF HEMOPHILIA NEONATORUM.*

BY H. FRED LANGE ZIEGEL, M.D.,
New York.

A newborn male infant, unusually large and healthy-looking, weighing 12 pounds at birth, had two congenital defects—tongue-tie and phimosis. Since the frenum extended to the tip of the bridled tongue, the organ could not be protruded beyond the gums, and failure of suction rendered satisfactory nursing impossible. The lips of the prepuce being adherent to each other and to the glans, the meatus urinarius was invisible; and on the second day of the infant's life the nurse reported that as yet no urination had been observed. To enable the little patient to urinate I retracted the prepuce over the glans, this manipulation exposing the meatus and causing a minute laceration on the anterior surface of the glans, where a small bleeding area was noticed. To check this oozing a strip of gauze was packed under the preputial tissue. In order that the infant might take nourishment naturally, it was decided to correct the lingual deformity at the same séance. Accordingly, the tongue was drawn toward the roof of the mouth, and with the points of the scissors a slit was made through the short, tight frenum. At the time of, and immediately after, this procedure there was no bleeding.

Some additional facts in the history are that the labor had been prolonged and difficult; the infant's head was exceptionally large and the lacerated perineum was immediately repaired with seven sutures. The mother's recovery was uninterrupted. There was no family history of syphilis. There was one other child, living and healthy, five years old. The cutting and tying of the umbilical cord caused no excessive bleeding. The temperature was not elevated. In fact, physical examination was negative, except for the large size of the infant and the congenital defects.

Six hours after the correction of the abnormalities the oozing from the glans penis had continued, and that there was now also hemorrhage from the mouth, which had appeared after nursing. The bleeding from the glans was stopped with silver nitrate. But the hemorrhage from the mouth was not checked so easily. Though blood oozed steadily from the cut surfaces of the frenum linguæ, yet no bleeding vessel was to be detected. Various hemostatic agents were applied with little effect upon the bleeding. After the application of ice and digital pressure for about an hour, however, the bleeding was apparently controlled.

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* Read at New York Academy of Medicine, Section on Pediatrics, October 10, 1907.

That same evening, about twelve hours in all after the division of the frenum linguæ, recurrence of the buccal hemorrhage was reported. Bleeding was now more profuse than in the afternoon, and after spending two hours in ineffectual attempts to stop the bleeding with styptics, astringents, packing and compression, I summoned Dr. Chas. A. Elsberg. The various measures tried previously were again found to be of little avail, and no better success attended the use of adrenalin. Dr. Elsberg now tried to bring the bleeding surfaces into apposition by suture, but since there resulted increased hemorrhage from the suture holes this attempt was not long persisted in.

The patient was then admitted with the diagnosis of hemophilia neonatorum to Mount Sinai Hospital. The preputial hemorrhage reappeared, but, as before, this was easily checked. The hemorrhage from the mouth was more profuse than ever. Dr. Elsberg called attention to the fact that there were no bleeding vessels to be found, but that at the site of incision and needle holes the blood escaped in a steady flow from the substance of the tissue as a capillary oozing. Collected in a vessel, the blood was pale, had the appearance of water in which meat had been washed, and gave no evidence of normal clotting.

Styptics, astringents, ice, pressure, additional sutures, the actual cautery, and enemata containing calcium chlorid and gelatin, were all employed in vain. The infant became exsanguinated and died seven hours after admission to the hospital.

Unfortunately, an autopsy was not granted. After death the weight of the body was 9½ pounds. Thus the loss of blood by weight was perhaps as much as 2 pounds.

As to hemophilic family history, the genealogy was not satisfactorily traced; the maternal grandparents were not known to be bleeders. Formerly it was denied that the condition can occur without a distinct hemophilic heredity, but now a *de novo* origin of the disease is regarded as possible (Legg, Kinnicutt).

It should be noted that the bleeding from the mouth did not occur till some hours after the frenum was cut. According to Legg, one of the characteristics of hemophilia is the fact that "often the uncontrollable hemorrhage does not come on with the first infliction of the wound, but some hours, or even a day, after the hurt has been given."

To be distinguished from hemophilia neonatorum is the condition known as infectious hemophilia, or spontaneous hemorrhages of the newborn, which latter malcondition is not nearly so rare. These cases are supposed to be of bacterial origin and are characterized by spontaneous hemorrhages in different parts of the body, umbilical hemorrhage, jaundice and elevated or subnormal temperature.

That hemophilia can exist during the first few days of life is proven by the experiences of Larrabee, Grandidier, Legg and Stengel. Recently Larrabee reported a case in which uncontrollable hemorrhage followed a scratch made on the baby's scalp in artificially rupturing the membranes. This author collected from the literature 37 cases of hemophilia neonatorum which he regarded as authentic. Undoubtedly there are many cases which were never reported for the reason that they were fatal.

In Grandidier's cases of hemophilia in the newborn mentioned by Legg, there were two deaths following the correction of congenital phimosis and one death caused by cutting the frenum linguæ for tongue-tie.

Alfred Stengel has observed a case in which death occurred immediately after birth, "the hemorrhage in this instance coming from an abrasion produced in the infant's mouth in the delivery of the after-coming head." Stengel also recognizes the distinction mentioned before, remarking that in cases of the truly hemophilic type "the cutting and tying of the umbilical cord rarely give rise to excessive bleeding."

Ever since a year and a half ago, when this unfortunate case occurred, I have reproached myself for having slit the frenum linguæ as early as the second day, and undoubtedly this procedure was reprehensible. But the intended end seemed to justify the supposedly harmless means, and I have no doubt that a fatal termination from hemorrhage would have occurred a few days later, when ritual circumcision was to have been performed.

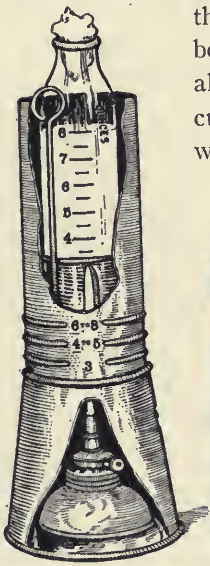
AN AUTOMATIC BOTTLE-WARMER.*

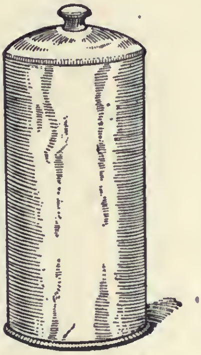
BY ROWLAND G. FREEMAN, M.D.,

New York.

Although many bottle-warmers are available, there is, so far as I know, no bottle-warmer which will invariably produce a definite temperature in bottles of milk before feeding, so that it does not need to be watched carefully by the nurse.

On the occasion of my presenting to this society many years ago a pasteurizer which required no control by thermometer, Dr. Rotch requested that I devise a bottle-warmer on the same principle. This, although theoretically easy, proved a rather difficult task, but finally I am able to present a bottle-warmer constructed on the same principle as the pasteurizer, which will produce a fairly definite temperature of about 100° F.





The apparatus consists of a vessel for water and a receptacle for a bottle of milk. The vessel is heated by an alcohol lamp. This vessel has three grooves to indicate the amount of water to be used: the lower groove for heating 3 ounces of milk; the middle groove for heating 4 or 5 ounces of milk, and the upper groove for heating 6 to 8 ounces of milk.

This vessel is filled to the proper groove with water and covered, the receptacle having been left out. The alcohol lamp is kept lighted until the water has boiled vigorously. In the meantime the bottle is placed in the receptacle, where it is surrounded by cold water. As soon as the water boils thoroughly the alcohol lamp is extinguished. The cover is removed, the receptacle holding the bottle of milk to be heated is put into the vessel and it is recovered and left for ten minutes, at the end of which time the bottle of milk should have become heated to a temperature suitable for feeding.

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* Presented before the American Pediatric Society, Washington, May 8, 1907.

The precautions to be observed in the use of this apparatus are:—

First.—The water must boil vigorously.

Second.—The boiling water must reach the proper groove.

Third.—The space around the bottle in the receptacle must be filled with cold water.

TORTICOLLIS: THE RESULTS OF THE TREATMENT OF CASES OF ACQUIRED AND CONGENITAL MUSCULAR TORTICOLLIS AT THE BOSTON CHILDREN'S HOSPITAL SINCE 1879.—E. H. Bradford and James Warren Sever (*Boston Medical and Surgical Journal,* August 22, 1907) write that, in view of the study of this large number of cases (90), covering such a long period of time, they think that the following conclusions may be stated, namely: (1) That congenital or acquired muscular torticollis may be cured; (2) that an open incision, with complete division of the two heads of origin of the sternocleidomastoid muscle, is all that is necessary, except in unusual cases; (3) that the horizontal incision below the clavicle in the line of the skin cleavage is the best to use, in that it gives adequate room and also gives the best cosmetic results; (4) the plaster-of-Paris is the easiest applied, holds the head in the corrected position, and allows ambulatory treatment, and is, therefore, the best immediate dressing; (5) that the plaster cuirass should be worn not longer than two months; (6) that the Buckminster-Brown brace, Thomas collar, or wire collar should be worn for an average of four months following the removal of the cuirass; (7) that it is best to operate on cases between the ages of two and twelve years, to insure a good result and prevent permanent bony deformity of the face and head.—*Medical Record.*

Clinical Memoranda.

TWO BABIES WITH INFANTILE SCURVY OBSERVED IN ONE WEEK.*

BY MAURICE OSTHEIMER, A.B., M.D.,
Senior Instructor in Pediatrics, University of Pennsylvania.
Philadelphia.

During the past summer, I was called to attend 2 cases of scurvy in a single week.

The first case occurred in a boy of twelve months. His mother, a most intelligent woman, had already made a diagnosis of infantile scurvy from reading Dr. Starr's book; but she wished her diagnosis confirmed professionally, and her baby correctly treated.

The boy had been most carefully fed upon condensed milk for the first four weeks, then upon a cream and barley-water mixture. This was continued until he was three months old, when Eskay's food was added. His mixture was gradually increased in strength until, at twelve months, he was taking daily 24 ounces of barley-water and 16 ounces of a 16 per cent. fat cream, with the addition of seven teaspoonfuls of Eskay's food. Analysis of this mixture showed over 6 per cent. of fat!

The boy was tall and pale, but well nourished. There were no teeth, and no symptoms had appeared until eight days before I saw him, when his mother noticed that he cried whenever she touched him. This had been growing worse, but even when I saw him there was no infiltration of the muscles of the calves, although the boy cried even before being touched.

The high fat mixture was discontinued and undiluted milk given him. A whole orange was also ordered every day. Upon this treatment his symptoms wholly disappeared in six days. Since that time he has grown well and strong, and several teeth have come through. He walks well and is beginning to talk now.

Five days afterward I was called to see the other case—a boy of eleven months. He had been breast-fed for four weeks and then was given a modified milk mixture. As this failed to agree with him, Eskay's food was tried, added to equal parts of milk and water. Then he gained in weight, several teeth came through, and he seemed to be doing very well until his parents noted that he cried whenever he was touched, and for some time they imagined he had pain in his chest. On this account the baby's chest was rubbed frequently, and he always howled during the rubbing. Later they noticed that even rocking his chair seemed to hurt him; and then that his feet and legs were swollen. I saw him after these symptoms had persisted for seventeen days, and the legs and feet both showed decided infiltration. His calves were much swollen and very painful.

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* Read at the Meeting of the Philadelphia Pediatric Society, Oct. 8, 1907.

The Eskay's food was omitted and the strength of his mixture rapidly increased, so that he was taking undiluted milk when twelve months of age. He was also given an orange a day. In three days his mother noticed that he no longer cried when touched, and in a week all swelling had disappeared. He can talk now and is just beginning to walk.

In both of these cases there were comparatively few symptoms—pain on being touched and, in one, some swelling of the legs. There were no oral symptoms in either case. These fairly typical cases of infantile scurvy seemed to be worth reporting on account of the apparent frequency of the condition among the children of the better classes.

225 South Twentieth Street.

BUTTERMILK AS AN INFANT FOOD.—August Strauch states that buttermilk has proven to be one of the best dietetic remedies for gastrointestinal diseases of children, according to the extant medical literature of Germany. Sour buttermilk, however, is not to be administered in its raw primary state, but should be more or less modified. According to Rubinstein's studies pathogenic bacteria (of diphtheria, typhoid, tuberculosis, Bacillus pyocyaneus), as a rule, gradually perish spontaneously in buttermilk. The acidity of the food promotes tryptic digestion. The digestibility of the nitrogenous substances of buttermilk lessens the work of the glands of the stomach and intestines. No absolute rules can be formed for the indications for the use of buttermilk.—*Medical Record.*

A CASE OF VINCENT'S ANGINA.

BY J. E. HUNT, M.D.,
Kansas City, Mo.

Seeing only an occasional reference to Vincent's angina in the literature and almost nothing about it in the text-books on pediatrics, I feel that it is worth while to report these cases.

Dr. Cotton in his book says, in reference to the constitutional manifestations, that they are very slight in comparison with the fever and malaise of follicular tonsillitis.

The case in hand differed somewhat from the above in that for a number of days there were marked constitutional symptoms; so marked, in fact, that I was tempted to preclude the Vincent's angina from the category of possibilities. With one other exception the case was quite ordinary, as will be seen from the following history:—

John T., colored, age five years, came to the dispensary with his mother, who said that the boy had been feeling ill for about a week, and for the past three or four days had had fever and occasional epistaxis. Two days before entering he had pain on swallowing. There was no family or personal history of syphilis. He was well nourished, had never had diphtheria and was not subject to stomatitis.

On examination I found both tonsils covered by a greasy, friable, dirty brown pseudomembrane, with a small but deep ulcer on right side. The rest of the oral cavity was free from any inflammation. The child drooled a good deal and had a profuse, watery nasal discharge. The breath was foul. The glands at the angles of the jaw were distinctly enlarged and only moderately hard. Temperature, 103.5°F.; pulse, 120.

A smear was taken, and while waiting for a bacterial examination the child was given potassium chlorate and aconite, with a laxative; no local applications. The smear showed practically a pure infection by the Vincent bacillus and spirillum. The child was seen the next morning and was very much better, with a marked lessening of the membrane, although the ulcer on the right tonsil was still deep. By the continued use of the potassium chlorate the child made a complete recovery.

The two points of particular interest in this case were the high temperature and the localized character of the disease. Whether the nasal discharge and the hemorrhage indicated nasal involvement was not determined, but since the pharynx was clear it is not probable that the nose was involved.

A CASE OF MULTIPLE SARCOMATA IN A YOUNG CHILD.

BY DE RUYTER HOWLAND, M.D.,
Bridgeport, Conn.

The patient, Baby M., was admitted to the Bridgeport Hospital on the 6th of March, 1907. He was eighteen months old, the youngest of eleven children, all the others being healthy. The maternal grandmother died of carcinoma of the breast. The parents are both healthy, and the mother has had no miscarriages.

The child was a healthy baby, and had had no serious illness until September, 1906, when it was noticed that the right testicle was larger than the left. The physician who was called to examine it considered it to be a malignant growth, and advised immediate operation. The parents delayed, and in the meantime the patient contracted measles and then pertussis. Early in January, 1907, the left leg and arm became very weak. About the same time the right thigh rapidly enlarged.

The child was then taken to a hospital where the condition was diagnosed as inherited syphilis, and treated as such for two weeks. During this time it had a seropurulent discharge from the left ear and nearly complete left hemiplegia was observed. While in the hospital numerous small, elevated, hard lumps appeared on the skin. These were scattered over the entire body and head, there being 153 in all. They were movable with the skin and showed no tendency to ulcerate. The child was then sent home.

After several weeks it was brought to the Bridgeport Hospital. There was marked emaciation and the skin had a peculiar yellow, waxy look. There was complete left hemiplegia. The cornea of the left eye was ulcerated. There was slight perception to light in the right eye. Both ears were deaf. The child was very restless, rocking its head and throwing off the clothes as fast as they were put back. It had a feeble, whining cry all the time. There were a few râles in the chest. The right testicle was as large as a golf ball, hard and nodular. The veins of the scrotum were prominent. All the superficial lymphatic nodes were greatly enlarged, especially those of the inguinal and axillary regions. The spleen was felt 2 cm. below the lower margin of the ribs.

The right thigh measured 4 cm. more in circumference than the left, and the lower two-thirds of the femur were markedly enlarged.

A diagnosis of sarcoma was made. During the six days that he lived he ran an irregular temperature, had rapid respiration and pulse. He took and digested milk from the bottle. He became rapidly worse, and died on March 12th.

Partial autopsy was obtained. The meninges were adherent to the brain, were thickened and studded with nodules. There was a small, hard growth in the pons. The right testicle had the typical sarcomatous look. A nodule from the skin was also removed for examination.

The microscopical report was that it was a small round-celled sarcoma, all the specimens showing the same. The primary growth in this case seems to have been in the testicle.

Bridgeport Hospital.

EPILEPTIC DEMENTIA IN CHILDHOOD AND ADOLESCENCE.—Voisin (*Rev. Mens des Mal de l'Enf.*, August, 1907) says that dementia is a common termination of certain forms of convulsive epilepsy; that it may manifest itself in childhood, but more often in adolescence. Coming on in early childhood it prevents mental development of the child, and constitutes acquired epileptic idiocy. Coming on in later childhood or in adolescence, it may or may not be accompanied by phenomena of spasmodicity. In the latter case it may lead to so-called dementia precox in one of its several varieties. Its course may be slow or very rapid; in rare cases general paralysis may cause dementia in young epileptics. While the spasmodic dementia appears to occur directly in the evolution of epilepsy, epileptic dementia precox seems to be a degenerative process, and the epilepsy itself does not play so direct a rôle in its production.—*Interstate Medical Journal.*

ARCHIVES OF PEDIATRICS.

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Contributors and Correspondents, see page III.

THE TUBERCULIN EYE TEST.

During the past year a very great advance has been made in the early diagnosis of tuberculosis in children through the adaptation to the conjunctiva by Calmette of the tuberculin skin inoculation reaction. Von Pirquet had found that forty-eight hours after inoculation of a small amount of tuberculin into the skin through a slight scarification, there would appear some redness and edema at the site of the abrasion; next a papule would appear similar to a pseudovaccination. This papule would soon begin to dry up and by the end of eight days it, together with the redness, would have entirely disappeared. Calmette conceived the idea of simply dropping a solution of tuberculin into the conjunctival sac, and before the Academy of Sciences in Paris, June 17, 1907, he described his method. He makes use of a watery suspension of dried tuberculin which has been precipitated by 95 per cent. alcohol. One drop of a 1 per cent. "solution" freshly prepared is dropped into the conjunctival sac of one eye, making sure that both eyes are free from conjunctivitis or any other affection. After from three to five hours there appears congestion of the palpebral conjunctiva, which becomes bright red and somewhat swollen. The sac swells, reddens and has a slight fibrinous exudate upon it. This last is of importance. The congestion and injection increase and lacrymation ensues. The fibrinous exudate becomes more abundant and, at the end of about six hours, gathers in threads in the lower conjunctival sac. The height of the reaction is reached in from six to ten hours, but the patients make no complaint of pain and have only a little discomfort. There is no chemosis and the body temperature is not elevated. The opposite eye is used for comparison and the condition of the conjunctival sac or caruncle is to be particularly noted. After eighteen hours in children, or from twenty-four to thirty-six hours in adults, the congestion diminishes and soon disappears.

There is no reaction at all in patients who do not harbor tubercle bacilli. At most, in Calmette's experience, there was observed, from one to three hours after the instillation, a slight redness unaccompanied by any fibrinous exudate. The reaction fails with patients who are in the last stages of tuberculosis, in those who are very anemic, much enfeebled or moribund, and in young infants—those under nine months of age. The reason for this is that the reaction is not simply the result of an irritation of the locality by the tuberculin, but is an evidence of the power of the body cells to produce an antagonizing substance which in turn shows itself at the site of the inoculation.

Since the publication of Calmette's communication, the reaction has been given careful testing all over the world and the results have been unusually satisfactory and uniform. It is generally agreed that when a positive reaction is obtained it means that the patient has or has had recently in his body active tubercle bacilli. It does not mean necessarily that the patient is, at the time, suffering from active tuberculosis. Men who work in tuberculosis laboratories nearly all give the reaction, although they may be perfectly sound in health. In infants and young children, a positive reaction usually means tuberculosis; a negative reaction is of the greatest value in all doubtful cases, and particularly in infants over nine months of age and in young children, whose signs are often difficult to interpret.

On the other hand, as stated above, patients suffering from active tuberculosis if much debilitated may not give the reaction because the organism is too feeble. It has been found, moreover, that the suspension used may well be ½ per cent. instead of 1 per cent., and in normal salt solution. Again, it seems advisable not to use the test in patients whose eyes are already the seat of any inflammatory infection, since the resulting reaction may be so severe as to destroy or do great damage to both eyes.

This diagnostic method, because of its simplicity and harmlessness, will prove of the greatest value to the profession, and particularly to pediatrists, by enabling them to make an early diagnosis in obscure or doubtful cases where for any reason it has heretofore been impossible to employ tuberculin either injected or inoculated through the skin. Cases of latent tuberculosis, of lymph node tuberculosis—bronchial, cervical and mesenteric—and of tuberculous meningitis can now be diagnosticated earlier than heretofore and therefore properly managed.

THE TREATMENT OF TETANY BY PARATHYROID PREPARATIONS. —Loewenthal and Wiebrecht (*Deutsches Zeitschrift für Nervenheilkunde*) present the view that tetany is due to a disturbance of function of the parathyroids. The proof of the relationship of these conditions in man is still lacking and the writers have therefore studied the influence of parathyroid preparations on the disease. They find a favorable influence is exerted in many, but not all, cases of the disease. They believe that the good results reported in some cases of tetany from thyroid preparations is really due to the admixture with parathyroid. Four cases are reported supporting the views expressed.—*Montreal Medical Journal.*

Bibliography.

THE SEXUAL INSTINCT: ITS USE AND DANGERS AS AFFECTING HEREDITY AND MORALS. By JAMES FOSTER SCOTT, A.B. (Yale), M.D., C.M. (Edinburgh), Late Obstetrician to Columbia Hospital for Women, and Lying-in-Asylum, Washington, D. C.; late Vice-President of the Medical Association of the District of Columbia, etc. Second Edition, Revised and Enlarged. 8vo. 474 pages, Ill. Cloth, postpaid, $2. New York: E. B. Treat & Co.

The second edition of this valuable book upon a subject of the greatest importance to the community combines all the good features of the previous edition, together with certain additions which render the book more useful. Since the first edition has been published there has been an awakening throughout the world to the importance of instructing youth upon this subject in order to prevent the ills which are in a large part the result of ignorance or faulty information. In the United States in particular there has been established the Society for Sanitary and Moral Prophylaxis. All physicians, and particularly those who have to deal with growing boys and girls, will find this book of value in giving up-to-date information upon what is being done along this line. They will also find it a safe book to be put into the hands of young men and teachers, particularly college instructors. Besides pointing out the dangers that arise from abuse of the sexual instinct, the author appeals to the sense of justice and the sentiment of chivalry, both of which are very strong in the adolescent.

The entire field is covered and the discussion is most judicious. As the author says in his preface, no harm of any kind could be derived from its pages. A complex index adds greatly to the usefulness of the work.

"THE CLIMATIC TREATMENT OF CHILDREN." By FREDERICK L. WACHENHEIM, M.D., Chief of Clinic, Children's Department, Mt. Sinai Hospital Dispensary, New York. 400 pages. Price, $2.50. New York: Rebman Co., 1907.

About one-half of this book is devoted to the general consideration of climate as a therapeutic measure and to a study of the climatology of North America, and its Health Resorts. The latter portion of the book discusses, in the first place, the climatic management of the normal child, and, after this, the treatment of Visceral Diseases and Tuberculosis by means of climatic change. The little volume is a valuable addition to the therapeutics of childhood, giving, as it does, in succinct form, a *résumé* of the conditions to be found in the United States, together with the reasons for sending children affected with various diseases to the different Health Resorts.

ATLAS AND EPITOME OF DISEASES OF CHILDREN. By DR. R. HECKER and DR. J. TRUMPP, of Munich. Edited, with additions, by ISAAC A. ABT, M.D., Assistant Professor of the Diseases of Children in Rush Medical College, in affiliation with the University of Chicago. With 48 colored plates, 147 black and white illustrations, and 453 pages of text. Cloth, $5 net. Philadelphia and London: W. B. Saunders Company, 1907.

As a rule, it is unwise to recommend a small compend on any large subject, for the discussion of many of the topics included must necessarily be inadequate. This criticism applies somewhat to the present volume. On the other hand, the book is so thoroughly illustrated by accurate and beautiful plates, as well as by numerous figures in the text, that the work presents a very satisfactory *résumé* of all the important conditions met with in childhood. The anatomy and pathology of children are especially well treated. In addition to having the opinions of the authors, the book is drawn largely from the experience of Professors Heubner and Escherich; so that it represents the best opinion of the German pediatrists. This atlas and epitome can be recommended all the more because it has been carefully edited by Dr. Isaac A. Abt, of Chicago.

DYSPNEA AND CYANOSIS. By PROF. EDMUND VON NEUSSER, Professor of the Second Medical Clinic, Vienna; Associate Editor *Nothnagel's Practice of Medicine.* Authorized English Translation by ANDREW MACFARLANE, M.D., Professor of Medical Jurisprudence and Physical Diagnosis, Albany Medical College, etc. 203 pages. Price, $1.50. New York: E. B. Treat & Co., 1907.

This little volume is Part 1 of von Neusser's "Clinical

Treatises on the Symptomatology and Diagnosis of Disorders of Respiration and Circulation." The symptoms of dyspnea and cyanosis are taken up and discussed with reference to each affection in which they appear, so that a very interesting and valuable book is the result. It seems really surprising in how many conditions these symptoms may be present. The causes of dyspnea and cyanosis are considered, and then there is a study of these symptoms in diseases of the respiratory tract and of the circulation. The work is characteristically German in its thoroughness. The section on poisons, for example, takes up twenty pages.

The subject is one which interests every practitioner of medicine. The pediatrist will be particularly interested in the discussion of these symptoms as they occur in laryngeal affections, in congenital heart disease, and in the infectious diseases.

The author is a believer in the efficacy of oxygen inhalations.

PROGRESSIVE MEDICINE. Edited by HOBART AMORY HARE, M.D., assisted by H. R. M. LANDIS, M.D. Contributors to the present number: Wm. B. Coley, M.D., John G. Clark, M.D., Edward M. Foote, M.D., Alfred Stengel, M.D., and Edward Jackson, M.D. Published quarterly by Lea Brothers & Co., Philadelphia.

Dr. Wm. B. Coley presents a very complete monograph on his subject of Hernia, including the rarer types of the affection. Surgery of the Abdomen, by Dr. Foote, treats in about 100 pages of the surgery of the stomach, intestines, liver, spleen and pancreas, and contains many good plates illustrative of new operative procedures. Dr. Clark, under Gynecology, reviews at length the present status of the question of the origin of cancer and of the various operative measures for cancer of the uterus, dwelling with especial stress upon the necessity of early diagnosis in this disease. Dr. Stengel, under Diseases of the Blood, describes the various blood disorders, including with them Gout, Diabetes and Obesity, and giving the results of newer methods of treatment. Much information has been compressed into Dr. Jackson's treatise on Ophthalmology, and it is one of the best in the book. In all respects this is an excellent volume.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, October 10, 1907.

GODFREY R. PISEK, M.D., CHAIRMAN.

THE DIAGNOSIS OF TUBERCULOSIS BY CUTANEOUS INOCULATION.

DR. LOUIS FISCHER said that the method of cutaneous inoculation of tuberculin inaugurated by Von Pirquet in Vienna had proven a valuable aid in many forms of suspected tuberculosis, while the older method of subcutaneous injection had many objections and had fallen into disrepute.

The method is simple. Under aseptic precautions, scarify three small areas and into two of them inoculate dilute tuberculin, leaving the third for a control. Use one part of old tuberculin to three parts of normal salt solution. In twenty-four to forty-eight hours there will appear a marked local inflammatory area at the site of the inoculations about ten millimeters in width if the reaction is positive. Von Pirquet discards such cases as have a much larger reaction. There are few, if any, constitutional symptoms. Out of 700 inoculations only three had fever. The reaction may remain visible for several days in infants and even six weeks in older children.

Dr. Fischer demonstrated such a local reaction and showed photographs illustrating this reaction.

DR. WALTER B. JENNINGS exhibited a boy eight years of age with a typical anterior poliomyelitis. The onset was sudden, the paralysis left-sided, and pain was a prominent symptom.

TREATMENT OF HERNIAS BY HIGH FREQUENCY CURRENTS.

DR. HERMAN C. FRAUENTHAL presented a child who had both an inguinal and an umbilical hernia following whooping-cough. After four treatments with high frequency currents there was great improvement in the condition.

DR. L. E. LA FÉTRA, in examining the patient, found evidences of the hernia coming down and asked what Dr. Frauenthal considered the child's condition to be.

Dr. Frauenthal replied that the case was shown to-night because it had improved under a few treatments, and he hoped to be able to report on it again in the future and show what that would bring.

A FATAL CASE OF HEMOPHILIA NEONATORUM.

Dr. H. Fred Lange Ziegel reported this case.

(See page 121.)

SOME OBSERVATIONS ON THE RECENT EPIDEMIC OF ACUTE POLIOMYELITIS.

Dr. J. F. Terriberry, reading this paper, spoke of the fact that anterior poliomyelitis constituted 8 per cent. of all the diseases of childhood and caused 50 per cent. of all limps, rarely leaving its victim whole. He said that the disease has been known to occur in epidemic form since 1841, but that so far we have no definite idea as to its etiology, and in its management are forced to patch up and to prevent deformities, being unable to stay or prevent the disease.

During the epidemic in New York City in August and September, his attention was drawn to a triple epidemic in Ridgway, Pa., of typhoid fever, cerebrospinal meningitis and anterior poliomyelitis. Investigating the situation, Dr. Terriberry found that the typhoid fever had been carried through the medium of infected spring water; and that there were no cases of meningitis, those thought to be such being really cerebral forms of anterior poliomyelitis.

The epidemic of this disease began at a town twelve miles above Ridgway, on a very dirty little stream which flows into the Elk Creek on which is Ridgway. Two weeks after it appeared here cases were found in Ridgway, and a week later cases were reported from a town twelve miles below Ridgway on a stream into which the Elk Creek flows. During part of last summer, these water courses had been dried up for the first time in several years. This hot dry season reproduced what was the condition in New York during the past summer, and what had been noticed in the epidemics in Vermont as noted by Caverly, in San Francisco as reported by Alice Woods, and in Sweden as reported by Medin.

There were about 50 cases in and around Ridgway in a radius of fifteen miles, and the infection followed the polluted waterway. Of the 50 cases 4 died, 3 of these infants of two to six months, of bulbar symptoms after an illness of a day or two. The fourth, a girl of twelve years, died from cerebral symptoms, although at the onset her illness indicated cord involvement only. There was very little gastrointestinal or respiratory trouble preceding the onset of the anterior poliomyelitis. Previous to this summer there had been, in the recollection of one physician, only 3 or 4 cases in twenty-two years.

Dr. Terriberry further said that men who had seen a great many cases of the disease know how difficult it is to make a positive diagnosis early in the course of it, especially in those cases where the muscle weakness is delayed. In examining for this the child should be laid upon its back with its arms and legs extended, each extremity raised and let fall. A precipitate fall indicates muscle weakness.

Treatment at first is eliminative. Later rest, maintenance of the muscles and prevention of deformities constitute the management.

DR. SIMON FLEXNER said that he hoped to be able to make some bacteriological study of these cases. He wished to make an appeal for spinal fluid if obtained early in the disease, and for autopsy material, although the disease was only rarely fatal. He was particularly anxious to get specimens in the fresh state, before hardening. So far as the spinal fluid was concerned, Dr. Flexner said that he found no evidence from the bacteriological and morphological study of changes in it indicating inflammation of the membranes of the cord.

DR. HENRY W. BERG expressed his regret that there was no adequate means in New York City of keeping track of an epidemic of a non-fatal disease such as the one under discussion had been, and believed that there should be some way for keeping records so that the true extent might be known.

Dr. Berg had seen 25 cases from June to September in the practice of fourteen physicians. He reported some of the more interesting of these.

DR. L. EMMETT HOLT spoke of some cases seen in this epidemic in which the symptoms indicated involvement of the upper part of the cord and medulla. One child of twelve months was admitted to the Babies' Hospital on the fifth day of the disease with paralysis of the neck, trunk, all four extremities and the thoracic muscles of respiration; complete loss of voice; diaphragmatic respiration, but no cerebral symptoms. The child at the end of two weeks had begun to regain power in the extremities. Death occurred at the end of the third week of the disease, apparently from failure of respiration. Two other deaths from the disease, complicated by pneumonia, had occurred in the Babies' Hospital, also in young children.

The speaker had also seen 1 fatal case in private practice. A boy of eight years was taken ill on Sunday and died the following Saturday. The early constitutional symptoms were severe, followed by paralysis of both legs and one arm. The patient was apparently doing well up to the fifth day, when symptoms pointing to failure of heart and respiration rapidly developed, and he died in six hours. Six days after the onset a second child in the family, a boy of five years, was taken. This case ran a milder course and the child recovered with a paralysis of the legs.

Two years ago another instance of 2 cases developing near together in the same family had come under his observation. The first case was a very severe one, and death occurred from respiratory failure on the fourth day. The second case developed three days after the first and recovered, except for the paralysis of both lower extremities.

Dr. Holt had seen in the present epidemic a number of very mild cases, in some of which a complete recovery had occurred at the end of three or four weeks.

In the early acute stage the diagnosis was difficult, as some of the cases he had seen had symptoms strongly suggesting cerebrospinal meningitis.

The treatment employed had not seemed greatly to influence the course or result of the disease. This depended rather upon the severity of the infection and was usually indicated by the height of the temperature and the duration of the febrile symptoms. He thought the present epidemic was quite widespread, as he had seen personally cases in five or six towns ranging from twenty to ninety miles from New York, mostly in the Hudson River Valley.

Dr. Henry Dwight Chapin called attention to the great extent of the paralysis in the present epidemic, and said that in many cases the neck muscles were involved, a rather unusual distribution. He recalled 1 case in which there were respiratory phenomena. This patient left the hospital and finally died with bulbar symptoms. Another case had complete paralysis of the muscles of the neck, back and extremities.

In the epidemic of 1889 at Poughkeepsie, pain in the arms and legs was a marked feature. In several of those cases he was uncertain whether he was dealing with a peripheral neuritis or a poliomyelitis. One child died, and at autopsy the typical lesions of poliomyelitis were seen.

Dr. Chapin said it was a difficult matter to get the Board of Health to take cognizance of the disease.

DR. GODFREY R. PISEK said he had seen 12 cases in his private practice and a greater number in the hospital and dispensary. In 8 of his cases there was a previous gastroenteric infection, and it seemed to him quite possible that the intestinal bacterial flora were at the basis of the disease. He said we should look more to the examination of the feces for etiological factors. In 6 of his cases lumbar puncture had been done with negative findings. The urinary examinations were also negative.

DR. JOSEPHINE HEMENWAY said that at the Babies' Hospital, during five years, there had been 15 cases. This year there had been 3 cases during August, 10 during September and 6 so far in October. The cases were all severe, involving three or four extremities, and there were several cases with neck involvement. All had a sudden onset. A number of the early cases had been diagnosed as cerebrospinal meningitis. In these cases there were rigidity of the neck, opisthotonos, hyperesthesia with paralysis coming on several days later. In only 5 were there gastrointestinal symptoms. Two came from a home outside of New York City, where the children were in bed side by side. The first symptoms occurred seven days apart. One case was in the hospital but twelve days; at the end of this time there was distinct motion on flexion of toes, ankles and knees. Four days later, however, he had a similar attack with high fever, and all four extremities involved, which was the condition of the child at present. This was the only case she knew of recurrence of the symptoms.

Dr. T. Halsted Myers reported a case where the diagnosis was doubtful between cerebrospinal meningitis or an anterior poliomyelitis. Lumbar puncture was done with negative results. There was paralysis of one arm. Within thirty-six hours the paralysis cleared up entirely, and in forty-eight hours the coma had disappeared entirely and the child was practically well.

Dr. Charles G. Kerley said he had seen 33 cases, 13 of which were included in Dr. Hemenway's report at the Babies' Hospital. Within the first twenty-four or thirty-six hours the diagnosis of cerebrospinal meningitis was quite reasonable in the severe cases. A point Dr. Hemenway did not sufficiently emphasize was the mental apathy, the comatose condition from which it was almost impossible to arouse the patient. One case seen in consultation had been unconscious for four days, and when he began to speak it was nearly one week before he could enunciate clearly. He had seen 2 cases, both very mild, in one family.

Dr. Henry Heiman called attention to the fact that the same cases might have been seen by several men at different dispensaries. He had seen 36 cases in hospital and dispensary work. Of these, 29 were anterior poliomyelitis and 7 were polioencephalomyelitis, including the severe or bulbar type, of which 4 died. In 30 the onset was sudden. Rigidity of the neck was present in 4 out of the 11 hospital cases. Blood cultures taken in 4 cases were negative. Lumbar puncture in 6 cases showed slightly increased pressure. There was usually a leukocytosis, an indication that the disease is infectious in nature.

Dr. Heiman followed the treatment as outlined by Gibney and Whitman, namely, strapping the foot in the position of dorsal flexion.

Dr. Charlton Wallace said that at the Ruptured and Crippled Hospital during the last few months, especially since June, there had been seen 300 cases of anterior poliomyelitis. Month by month the number of cases had increased until October. In June there were 17 cases; July, 24 cases; August, 86 cases; September, 138 cases; and so far in October, 35. According to age he reported as follows: During the first year, 24; second year, 80; third year, 77; fourth year, 57; from fifth to eighth year, 41; from eighth to the twelfth year, 17; after the twelfth year, 4—a total of 300 cases. No cases had been recorded that did not show positive signs. There were 169 males and 131 females.

The treatment should be rest during the first three or four weeks, in plaster of Paris bandages, to prevent contractures. Afterwards some form of brace and general stimulation should be used, viz., electricity, massage, encouragement of the child to use its own muscles, etc. Many cases improve from year to year, and as the improvement progresses the brace treatment is diminished.

Dr. Wallace thought that the disease was an infectious one and that Dr. Flexner was on the right track.

Dr. Henry W. Frauenthal presented three photographs illustrating the facial paralyses which occur in cases of infantile paralysis. He had seen 5 such out of 80 cases at the clinic.

Dr. Herman Schwarz referred to a case where, before death, the paralysis of the left lower extremity disappeared, showing the rapidity with which function of such a part might be regained. At autopsy hemorrhages were found in the anterior horns and in the pia. Another case he recalled was a child, two years old, with a temperature of 102 at onset, and on the day following paralysis of all the extremities and the head. One month later he was completely cured. A third case had rigidity of the neck, temperature, etc., and it looked as if the child was going to become paralyzed, but did not. These three were distinct types—the first, the ordinary case as frequently met with; the second, one that recovered entirely, and the third, one that did not come to paralysis.

Dr. Sidney V. Haas presented some statistics compiled from Dr. Holt's clinic. There were 40 cases, 15 males and 25 females. No case was under six months of age, and none were over four years. The onset in 31 was sudden, in 9 gradual. Some cases occurred in families where there were other children, who did not become afflicted. In 1 case there were three children in the family, and the one taken ill was the only one who took milk that was not boiled.

Dr. L. E. La Fétra said he wished to emphasize certain features of the present epidemic. It had been stated that it was easy to make a diagnosis of the disease if the patient were seen after the first twenty-four hours; but there were many cases which had irritative and not paralytic symptoms and which, therefore, one must distinguish from multiple neuritis and from cerebrospinal meningitis. Even a careful man was justified in being in doubt as to the diagnosis in many cases. The type of cases seen in this epidemic is similar to that of the epidemic which occurred in Stockholm, and was described by Medin. In many of the cases there were hyperesthesia, sharp pains in the extremities, contractions of the various muscles, stiffness in the back of the neck. In a few cases Kernig's sign was present and persisted for days. The condition which it most closely resembled was cerebrospinal meningitis. Dr. La Fétra had seen 1 case that looked quite like a tuberculous meningitis; the child was flaccid, paralyzed and had irregular respiration—almost Cheyne-Stokes. It was not possible to make a positive diagnosis of poliomyelitis until after three days. In many cases there were gastrointestinal symptoms, such as colitis, which preceded the onset of the disease, but constipation was the rule during the attack. The intercostal and abdominal muscles may be affected, and also the bladder and rectum, so that micturition and defecation are very difficult.

As to the nature of the disease, the absence of cellular elements in the cerebrospinal fluid, the absence of leukocytosis in most cases, together with a low polymorphonuclear count, made one think that the disease is a toxemia, the result of some preceding trouble in the metabolism, or perhaps to some atmospheric condition, rather than an inflammation due to some specific organism.

So far as the early treatment was concerned, if it was a typical case, with fever and sudden paralysis, there was comparatively little to do. But in those cases which look like cerebrospinal meningitis there was much that could be done. The spasm could be relaxed by repeated warm baths, and it had been suggested that the patient be kept in this warm bath continuously. The application of a spinal ice-bag, alternating with a mustard paste along the spine, he believed to be efficacious. Where the temperature was low and there was much pain, the mustard paste along the spine was preferred. In 1 case he had used chloral with good effect, relaxing the spasmodic contractions, and quieting down the nervous system generally. If there was severe pain he used codein or morphin in very small repeated doses.

Dr. William L. Stowell read a paper on

BLOOD-PRESSURE IN CHILDREN,

which is published in full on page 88.

Dr. L. F. Bishop said that he believed the high blood-pressure of cerebral compression was purely compensatory to balance pressure on the brain. Dr. Haven Emerson had demonstrated that intracranial pressure increased by injecting water from a douche-bag through a cannula screwed into an animal's skull was accompanied by increased carotid pressure, and that this diminished when the water was allowed to escape. Arterial tension under these circumstances was an attempt on the part of the organism to maintain the circulation of the brain. Such a case was not benefited by nitroglycerin, and illustrated the point that all high blood-pressure in disease must not be arbitrarily reduced.

Dr. L. E. La Fétra asked that the Section on Pediatrics appoint a committee to meet with the one appointed by the Neurological Society for the collective investigation of anterior poliomyelitis in order that they might take such steps as might seem necessary to study the etiology of this disease. He moved that the Chair appoint a committee of three to confer with the committee which had already been appointed by the Neurological Section. Seconded. Carried.

Dr. Godfrey R. Pisek appointed the following: Dr. L. E. La Fétra, Dr. Josephine Hemenway, and Dr. Herman Schwarz.

Statistical Study of Whooping-Cough at Bretonneau Hospital, Paris.—(*These de Paris,* 1907; *Rev. Mens,* August, 1907.)—The prognosis of whooping-cough in the hospital is very serious on account of the great danger of grave complications, from which no patient in the hospital is safe. Cases of so-called hyperpertussis, with seventy or eighty paroxysms in the day, are very rare under proper treatment, but the danger of pulmonary complications is still very great. Mortality in this hospital ranges from 15 per cent. to 20 per cent. The author is of the opinion that cases of whooping-cough ought to be strictly isolated, even in the hospital, and that there should be no such thing as a whooping-cough ward.—*Interstate Medical Journal.*

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, October 8, 1907.

DAVID L. EDSALL, M.D., PRESIDENT.

CONGENITAL MALFORMATION OF THE THUMB.

DR. HERBERT B. CARPENTER presented a baby of nine months, showing congenital malformation of one thumb. The family history was negative as regards other deformities in the family. The baby is under treatment for gastroenteritis. The two well-developed digits are completely united through their entire length, articulating with a common metacarpal bone.

DR. J. T. RUGH said that these cases were especially interesting from the standpoint of function. The etiology is always obscure. In many cases there is an hereditary history of such deformities. In one family under his care, congenital malformation of the hands and feet has occurred in four generations. Dr. Rugh showed a plaster cast of a double thumb, made by him while resident physician at the Jefferson Hospital. The patient could grasp objects between the double thumb nails. There were separate phalanges for each thumb, articulating with the one metacarpal bone.

DR. ALFRED HAND, JR., had seen a similar, possibly the same, case. This man could hold objects most securely between the thumbs. Dr. Hand had also operated on one child whose mother had also had an extra finger.

DR. CARPENTER said that other deformities sometimes accompany this malformation, such as hypospadias. He also had seen cases of several children in one family having the same and other deformities.

DEFECTIVE CHILDREN, ONE PRESENTING SYMPTOMS OF CRETINISM.

DR. G. HUDSON MAKUEN showed three defective children, one of whom presented symptoms of cretinism. All three were feeble-minded and all had defective speech. While the normal child requires, for the development of normal speech, only good examples of speech and will imitate them accurately, the feeble-minded child will require special assistance in the development of speech. This was well shown by these cases. The first was a girl of twelve years, whose facial expression suggested the cretinoid state. The thyroid gland was absent, but there were no fatty growths above the clavicles. Two brothers and her maternal grandmother had defective speech in early youth. She can read history intelligently, but her speech is quite unintelligible. The second case was a boy of nine years, with ataxic gait. He showed marked disturbances of his reflexes. In the families of both parents stammering and stuttering were common. The third case was a boy of eight years, who had convulsions during his first summer. His speech was absolutely unintelligible. All these children have shown themselves capable of acquiring nearly, if not quite, normal speech.

Dr. E. E. Graham said that we are all brought in contact with cases in which it is difficult to decide how intelligent children are. When there is defective speech it is most difficult often to determine how defective that child's mentality may be. He asked Dr. Makuen to give an idea of his method of detecting which is the primary condition, and the connection between the defect in speech and the possible failure of mental development. Dr. Graham believes that generally they are very closely connected.

Dr. Hand said that it seemed rational to suppose that, even if defective speech is the result of mental deficiency, the speech defect still may react upon the failure of mental development.

Dr. Rugh discussed the etiology of these conditions. He gave in detail the history of a case of this kind under his care.

Dr. Edsall said that he had several times noticed that high-grade cretins could, like this girl, read and remember history to a remarkable extent, in spite of their moderate, or even limited, intelligence as regards other things.

Dr. Makuen said that a great many things should be considered in making the differential diagnosis. In the girl's case the speech defect is surely secondary to the feeble mind, to the cretinoid condition. The first boy has an awkward gait and his muscular system lacks tone. His defective speech is but one symptom of other constitutional defects which might have passed unnoticed had it not been for the peculiar character of the speech. In other cases apparent imbecility is dependent solely upon defective speech. Such children improve very rapidly after they learn to speak correctly. The question of heredity in these cases is interesting. In several instances the defective speech appeared only in the last child, when the parents' procreative powers were on the decline.

Dr. James H. McKee read a short paper entitled "Reminiscences and Impressions of the State Medical Society Meeting at Reading."

Dr. Alfred Hand, Jr., read a short paper reporting upon the papers on "Diseases of Children Read at the June Meeting of the American Medical Association."

Dr. Graham spoke of the diagnosis of tuberculosis from examination of the stools. Dr. Rosenberger has examined feces from several of his cases with success. To do this, however, requires an expert bacteriologist and a search of several hours.

Dr. Edsall spoke of Ruhräh's paper upon "mothering" infants. When he had charge of babies "farmed out" by St. Vincent's Home some years ago, he found that the babies taken into poor and often very dirty homes, but "mothered" there, did exceedingly well, while those left in the Home showed a dreadfully high mortality. He also alluded to Seibert's paper on cerebrospinal meningitis, and believes that this disease should be classed among the communicable diseases and should always be isolated. He referred to Ostermann's interesting study of cerebrospinal fever.

Dr. Howard Childs Carpenter reported a case of

FATAL ANEMIA, SECONDARY TO PYELONEPHRITIS, IN AN INFANT OF ELEVEN MONTHS.

The blood count showed 17 per cent. hemoglobin, 808,000 red blood cells, 8,840 white blood corpuscles. The urinalysis was typical of chronic pyelonephritis, revealing the cause of the anemia. The infant died a few days after coming under observation, and postmortem examination confirmed the diagnosis. This baby had been treated for eight weeks by the family physician simply for anemia, the doctor never having thought it necessary to examine the infant's urine.

Dr. Graham asked if the child had had pain.

Dr. Carpenter answered that the baby was too weak for any pain to be noticed. It had no evidence of scurvy.

Dr. Edsall saw a similar case a year ago, with Dr. Hamill. Clinically it was like Dr. Carpenter's case. Caffein was given, $^1/_{12}$ of a grain, for three or four doses, which caused temporary wild delirium, but was followed by the recovery of the child. The striking cerebral effects of so small a dose was a point of interest.

Dr. Maurice Ostheimer reported

TWO CASES OF INFANTILE SCURVY OBSERVED DURING ONE WEEK.

(See page 126.)

Epidemic Cerebrospinal Fever.—John Lindsay Steven, of Glasgow, as the result of his study of this interesting disease, formulates the following propositions: (1) That sporadic epidemic cerebrospinal meningitis or fever is probably more frequent in our midst than we have hitherto supposed; (2) that epidemic cerebrospinal fever is to be regarded as a specific disease and that it is in all probability caused by the diplococcus intracellularis meningitidis of Weichselbaum; (3) that in many cases the diagnosis can only be rendered certain by lumbar puncture; and (4) that all personal contact with the sick of such a nature as to render possible contamination by the excretions from the nose or the conjunctivæ should be strictly avoided, and that all such discharges should be thoroughly disinfected.—*The Lancet.*

Some Blood Cultures in Children and their Significance.—Rotch and Low (*Journal American Medical Association*) recommend the resort to blood cultures in children when other means fail to make plain the diagnosis. In certain cases blood culture reveals directly the cause of the disease. The procedure is more practicable in children than has been supposed. In the first four years of life it was possible in 21 per cent. of cases, in the second four years in 72 per cent., and in the third four years in 86 per cent. The blood is drawn from a vein in the arm with a glass antitoxin syringe and directly inoculated into the culture medium. Thirty-six cases were tested, 15 of which gave a growth. A negative result the authors believe to be of value in prognosis. In diagnosis the procedure is of greatest value in typhoid and in "cryptogenetic septicemias."—*Boston Medical and Surgical Journal.*

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, October 15, 1907.

J. W. VanDerslice, M.D., President.

THE BACTERIOLOGY AND PATHOLOGY OF GASTROINTESTINAL DISTURBANCES IN CHILDREN.

Dr. J. J. Gill read this paper. He said that all gastrointestinal disturbances may be included under two conditions, mechanical and chemical, and a third factor, the neurotic element, dependent on one or both for its existence.

Under mechanical disturbances he includes all forms of ileus, intussusception, volvulus, tumors, foreign bodies and parasites. The chemical disturbances include toxins generated by bacteria and by animal parasites, putrefactive products of food, drugs and chemicals.

Pathology has thus far failed to explain satisfactorily the lack of relation existing between the severity of the symptoms and the postmortem evidence of disease. It is probably due, in part, to the anatomic peculiarities existing in children. The relatively long intestine and the great length of the mesenteric folds permit of undue mobility, with the result that knots, kinks and angular bends may form and interfere with circulation and elimination.

In studying the stools of healthy infants, one is amazed at the number, variety and form of the different species of microorganisms. No single species is responsible for all or any of the gastrointestinal disturbances met with in general practice. In comparatively few diseases have we a specific organism which must be considered as the predominating factor, while many of those bacteria considered as non-pathogenic, or even saprophytic, may be the immediate cause of death.

Green stools may be due to the conversion of bilirubin to biliverdin, but are frequently caused by the presence of chromogenic bacteria. Red stools are frequently due to blood, but are occasionally the result of chromogenic bacteria, as in the case just cited.

PROPHYLAXIS IN THE GASTROINTESTINAL DISTURBANCES OF CHILDREN.

Dr. H. W. Cheney gave the following five factors:—

(1) To keep the digestive canal and other functions of the child as nearly normal as possible the entire year.

(2) A change of environment during the hot season—to the country, to fresh-air camps, etc.

(3) Education of the laity in regard to the proper feeding and care of the child.

(4) A proper appreciation by parents and physicians of the significance of the milder symptoms of this disease and a prompt attention to the slight derangements.

(5) Regulations regarding the production, transportation and sale of milk.

Case of Cerebrospinal Meningitis.—Isolation of the Specific Organism.—Preparation of a Vaccine.—Recovery. —Rundle, Mottram, and Williams (*Lancet*, July 27, 1907).—This article describes a remarkable cure of a patient with cerebrospinal meningitis by vaccination with a serum produced by inoculating vaccine. This was made as follows: A twenty-four-hour-old culture was inoculated into sterile normal saline solution and placed in a water bath at 60° C. for half an hour; agar tubes were inoculated from it and incubated overnight to test sterility. The number of cocci contained was estimated by mixing known volumes of washed normal blood and vaccine; these were then diluted with normal saline solution, films prepared at once and stained by Leishman's method. The number of organisms present was counted against the red blood corpuscles. The vaccine was freshly prepared for each of the first four doses; the fifth had been made seven days before use. No local reaction was observed after any of the injections. The patient, a male child aged six months, came under treatment at a time when the conditions justified an unfavorable prognosis. The apyrexia following the first injection of the vaccine recurred after subsequent injections. A rapid and complete recovery without definite relapses or involvement of special senses was the final result.—*Interstate Medical Journal.*

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. A. W. BINGHAM.
DR. HENRY HEIMAN.
DR. ALFRED F. HESS.
DR. M. NICOLL, JR.
DR. G. R. PISEK.
DR. S. W. THURBER.

PATHOLOGY.

SMITH, THEOBALD: THE CHANNELS OF INFECTION IN TUBERCULOSIS, TOGETHER WITH SOME REMARKS ON THE OUTLOOK CONCERNING A SPECIFIC THERAPY. (*Boston Medical and Surgical Journal,* September 26, 1907, p. 420.)

The author does not believe that the intestinal tract forms the chief portal of entry for the tubercle bacillus. Experiments tending to this view are fallacious, as in some cases too large quantities of bacilli were used, and in others inert substances, such as pigment granules, were employed. Nor does he consider that the bovine bacillus is the chief cause of infection, and believes that in all cases of tuberculosis it is responsible for not more than 1 per cent., and in persons over twelve years of age is rarely the exciting agent. Von Behring's theory of latency seems most illogical when we consider that it means that the tubercle bacillus, which is especially virulent for the young, should be able to lie fallow in some organ or tissue for years.

The chief danger lies in contact infection from human beings. If the cows with tuberculosis of the udder or clinical tuberculosis be eliminated, there will be but slight danger of infection from milk, even if some of the herd react to tuberculin. Practically all danger would be removed if such cows were killed as the result of periodical examination of the dairies, and if cleanliness were inforced. ALFRED F. HESS.

CALMETTE, A., AND PETIT, G.: EXPERIMENTAL INOCULATION OF STAPHYLOCOCCI IN THE DIGESTIVE TRACT. (*L'Echo Médicale du Nord,* March 3, 1907, p. 103.)

M. Bouchard long ago called attention to the influence of intestinal lesions in the production of furunculosis, and many other authors have noted the occurrence of osteomyelitis in subjects who did not present any visible skin lesion through which the staphylococcus could gain entrance to the circulation, and, conversely, that chronic gastroenteritis is very often accompanied by multiple abscesses of the skin.

From experimental inoculations of virulent staphylococci in the digestive tract of rabbits, the following conclusions were arrived at: (1) That the staphylococcus can readily traverse the mucous membrane, not only of the small, but also of the large intestine. (2) That it may be found in the blood of the peripheral circulation six hours after a meal infected with it. (3) That the characteristic lesions of osteomyelitis may appear after a single such meal in young and adult animals either spontaneously or following traumatism. (4) That even if neither abscesses nor osteomyelitis follow, the staphylococci, which have reached the general circulation by way of the digestive tract, may live a long time in the body, and that two months after a single infected meal they may be found in the bone marrow.

M. NICOLL, JR.

MEDICINE.

FINKELSTEIN, H.: ALIMENTARY INTOXICATION. INTOXICATION IN THE COURSE OF DISTURBANCE OF NUTRITION. (*Jahrbuch für Kinderhk.*, July 8, 1907, p. 1.)

Intoxication does not come out of a clear sky, but is the final stage and climax of a series of disturbances of nutrition. All the various clinical types of digestive disturbances are but different phases of a morbid entity. Thus, acute and chronic dyspepsia, cholera infantum, atrophy, etc., are not diseases, *per se,* but only stages of one disease. These terms should, therefore, be discarded, as they are superfluous and misleading.

The dynamic point of view, in the field of diseases of nutrition, is slowly replacing the descriptive and essentially static view held by clinicians for many years. To have a thorough understanding of a morbid condition, not only must we take into consideration the condition of the body, its organs and tissues, but also the abnormal functional activity of the processes of nutrition.

The state of the body is usually judged by the condition of the skin and the amount of blood in the tissues. We ascertain the degree of functional activity of the processes of nutrition by giving the organism a definite amount of work to do, *i.e.,* a fixed quantity of a certain food, and observing what deviation from the normal, if any, occurs during the performance of this work. In the process of nutrition, food is to be considered a specific functional stimulus, giving rise to a complex biologic reaction and resulting in the formation of new tissue and the production of certain waste materials.

Every phase of the process, the destruction, maintenance and construction of tissue, is accompanied by certain definite symptoms. The destructive process gives rise to heat. The maintenance of the tissues is shown by the normal activity of all the functions of the body, and the constructive process by the normal gain in weight. Besides these symptoms, we have a very valuable standard in the limit of tolerance of the body toward foods. In the normal organism no disturbance of the processes of nutrition occurs unless a very unusual demand is made upon them by a marked qualitative or quantitative change in the diet; not so with the diseased organism. Here a slight change in the diet is capable of producing marked disturbances in all the processes of nutrition. It is this limit of tolerance that serves the author as the means of separating the disturbance of nutrition into four stages:—

First Stage.—Stage of loss of balance; slight loss of weight, and slightly diminished limit of tolerance.

Second Stage (*Stadium Dyspepticum*).—Symptoms absent, only when the amount of food is below that necessary for subsistence. When this amount is exceeded, the stools become abnormal, and the temperature fluctuates.

Third Stage (*Stage of Decomposition*).—Limit of tolerance markedly diminished, marked loss of weight, temperature often subnormal, disturbed respiration, cardiac weakness, often bradycardia.

Fourth Stage.—Stage of intoxication, which has already been described in a previous paper by the author.

HENRY HEIMAN.

DELÉARDE: RACHITIC PSEUDOPARALYSIS. (*L'Echo Médicale du Nord,* March 3, 1907, p. 100.)

At the height of a well-marked case of rachitis, when the extremity of a long bone is attached to a cartilage whose cells are gorged with blood, and is bending under the body weight on account of the laxity of the muscles and ligament, the consequent pain on movement of the limb or attempts to support the body is localized at the level of the bony part affected by the disease. On this account the patient prefers to lie down in order to give relief to the lower extremities or lets the arms hang by the side if the upper are involved.

It is thus there is brought about a condition of apparent paralysis from muscular disuse. The nerves, however, will be found intact.

Diagnosis.—Parrot's disease (syphilitic pseudoparalysis), due to separation of the epiphysis, occurs in infants under six months of age born of diseased parents. The painful paralysis, described by Chassaignac in 1856, has a sudden onset in a child from two to five years following a traumatism, generally due to efforts made in attempting to prevent a fall. There is no appreciable anatomical lesion and recovery takes place in a few days.

Infantile paralysis comes on acutely, and affects one or more groups of muscles. There is little or no pain, and other characteristic symptoms are present.

Infantile scurvy has a number of symptoms with difficulty to be differentiated from pseudoparalysis.

Barlow emphasizes the fact, however, that scorbutic lesions are rare or very slightly marked at the extremity of the upper limb.

Gingivitis is, as a rule, present. The history of the case may help to make a differential diagnosis. M. NICOLL, JR.

GRAVES, WILLIAM W.: THE DIFFERENTIAL DIAGNOSIS BETWEEN CHOREA MINOR AND TIC. (*Medical Record,* August 24, 1907, p. 315.)

It is one of the triumphs of modern neurologists, says Graves, to have successfully differentiated chorea minor from other conditions resembling it. He says tic is a common and widespread disorder, almost as common as chorea minor. A correct diagnosis in chorea minor is not, but in tic is, absolutely essential to the patient's welfare. The distinguishing features are tabulated, of which the following are those likely to be most helpful:—

General nutrition suffers early in chorea, while tic has not such an effect. Facial expression in tic, quick and vivacious. Chorea, sullen or stupid. Coprolalia and echolalia are never present in chorea, but often present in tic. Choreic movements are usually general, while in tic they are usually confined to a single part. Voluntary movements in tic are never incoordinated. Choreic movements are made worse by voluntary effort to control them. Tic movements may be readily imitated. Tic is a habit, while chorea minor is a disease. G. R. PISEK.

DALY, WALTER S.: HYPERTROPHY OF THE PHARYNGEAL LYMPHATIC RING AS A CAUSATIVE FACTOR IN THE PRODUCTION OF EPILEPTIC EQUIVALENTS. (*Annals of Otology, Rhinology and Laryngology,* June, 1907, p. 338.)

Epileptic attacks in childhood disclose a morbid sensibility to peripheral irritation. Among causative factors we must consider hypertrophy of the adenoid and tonsillar tissue as prominent. A case in a boy ten years old is mentioned, who at the age of two began to have seizures of the grand mal type. At the age of five the attacks ceased and for a period of five years he acted like other healthy boys. Suddenly, in February, 1906, he began to have attacks of pain in the ears accompanied with illusions of sight and identity which would leave him dazed for a few hours. A physical examination at this time revealed nothing abnormal except marked hypertrophy of the pharyngeal ring, and removal of these obstructions has resulted in a cure up to the present time. S. W. THURBER.

ROTCH, THOMAS M., AND FLOYD, CLEAVELAND: THE OPSONIC INDEX AND THE TUBERCULIN TEST. (*The Journal of the American Medical Association,* August 24, 1907, p. 663.)

The authors believe that the necessity for making an early diagnosis in this disease is growing more urgent, because an early diagnosis usually means cure. It is also important to avoid the hardship of tuberculosis treatment and isolation of the child which would be imposed if a wrong diagnosis was made.

Koch's old tuberculin and the opsonic index were the methods employed to assist in the early diagnosis. The conclusions arrived at were as follows:—

The early diagnosis of tuberculosis in children is more important to-day than ever before, on account of the increased facilities for a cure and the possibility in this stage of preventing the spread of the disease, and also because a quiescent process may be prevented from becoming an active one.

Tuberculin is a valuable diagnostic agent in early tuberculosis, but when not used properly is dangerous, and in inexperienced hands may bring disaster.

The opsonic index may be of great aid in the early recognition of tuberculosis, especially when tuberculin cannot be given on account of temperature or prostration. The use of the opsonic index may give some indication for the control of the dose of tuberculin used for diagnosis as well as for its therapeutic effects.

G. R. PISEK.

MURRAY, H. MONTAGUE: ACUTE PNEUMONIA IN CHILDREN. (*British Medical Journal*, June 8, 1907, p. 1,345.)

In acute disease of the lungs in children an accurate record of the respiration rate is more important than one of the pulse-rate. An increase in the respiration rate depends upon the age, the toxemia, the extent of the lung involved and the rapidity with which this is thrown out of work. It is affected by any lack of rigidity in the ribs, by any failure in the vigor of the respiratory muscles, by any obstruction to the entry of air, or by any pain in the pleura or wall of the chest limiting the range of movement. All these factors must be considered in any one case. The respiratory rate is a measure of the defective aeration of the blood; a prolonged and considerable rise may be followed by a rapidly culminating exhaustion.

In acute pneumonia the respiration rate falls in two or three stages. The first is that accompanying the drop in temperature, and is the measure of the extent to which it was due to the same cause as the fever. A second and less marked fall sometimes occurs two to four days after the first; while the last fall occurs a week or ten days after the fall in temperature, when the inflammatory products are removed.

The return of the respiratory rate to normal is a practical sign that the risks of the extension of the disease, of sudden cardiac failure, and of general exhaustion, are over.

In cases of secondary extension of the disease the respiration rate does not usually fall below the first stage, remaining at that level until it rises again with the return of the febrile state.

In cases with a very gradual onset it may afford the earliest indication of a pneumonia complicating bronchitis. In later stages, when the fever is remittent, it may be the first sign of an extension of the disease.

A secondary rise in the temperature without an accompanying rise in the rapidity of breathing is reliable evidence that it is not due to an extension of the disease, and a rise in the respiration rate without a rise or with a fall in the temperature suggests muscular exhaustion and cardiac failure, and is, therefore, an extremely grave sign. A. W. BINGHAM.

SURGERY.

MITCHELL, ALEXANDER: STRANGULATED HERNIA IN AN INFANT. (*British Medical Journal,* March 11, 1907, p. 1,118.)

Boy, aged six weeks, breast fed, healthy and not known to have a hernia, became fretful, refused the breast, vomited and was constipated. A swelling was noticed in right groin. Examination next day showed a strangulated hernia in the right groin. His general condition was poor and the operation was done under local anesthesia. The hernia, consisting of a loop of small intestine, the cecum and appendix, was freed. Recovery uneventful. A. W. BINGHAM.

WILLIAMS, W. G.: ACUTE INTUSSUSCEPTION. (*British Medical Journal,* February 23, 1907, p. 435.)

A boy, aged three years, fell down four steps. A few minutes later he began to cry because of severe pain around his umbilicus. In half an hour his condition was rather alarming, the forehead was covered with cold sweat, the face pinched, the pulse 130 and irregular, and the temperature normal. Pains were frequent, but there was no vomiting.

The abdomen was not distended, but there was a distinct swelling in the right iliac fossa, more pronounced during the attacks of pain. Vomiting began one hour after the accident. The condition was relieved by the early use of morphin, followed by the injection of a pint of water with gentle manipulation of the tumor till it suddenly disappeared.

A. W. BINGHAM.

PRIVAT: THE DIAGNOSIS OF POTT'S DISEASE IN CHILDREN. (*La Pathologie Infantile,* February 15, 1907, p. 25.)

There are three certain signs—deformity, stiffness and pain. If all of these are present, the corset should be applied.

If deformity is present, and only one of the other signs: (1) When deformity is marked, apply the corset. (2) When not marked, and pain excessive, suspect an inflammation of the bursa. Pott's disease is seldom very painful.

If deformity alone is present, be careful that it is pathological, remembering that certain vertebræ may be slightly out of line, without the existence of a disease.

If deformity is lacking, but there is pain and stiffness, prescribe rest and await the beginning of deformity before applying apparatus. M. NICOLL, JR.

HYGIENE AND THERAPEUTICS.

BOGUE, E. A.: THE RELATION OF THE DENTAL ARCHES TO PATHOLOGIC AFFECTIONS OF THE NASOPHARYNX AND ADJACENT PARTS. (*The Journal of the American Medical Association,* July 13, 1907, p. 102.)

The relation of adenoids to the dental arches is pointed out by Bogue. He says he has learned to look upon the etiology of lymphoid growths as being generally identical with that of more or less narrow dental arches. He shows that, if taken early, irregularities corrected in the temporary teeth allow for normal permanent teeth, a straight nasal septum, and a consequent enlargement of all the adjacent bones of the head and face.

The operation on adenoids and tonsils is not always successful in restoring nasal breathing, because of an associated narrow dental arch. If orthodontia is resorted to in such a case a good result can be obtained. G. R. PISEK.

BARBIER, H., AND BOINOT, G.: THE VARIABLE COMPOSITION OF WOMAN'S MILK, AND SOME FACTORS WHICH INFLUENCE IT. (*La Tuberculose Infantile,* December 15, 1906, p. 203.)

The writers, through careful examination of the breast milk of women confined in hospital, emphasize very clearly the fact of its variable composition, not only in different women, but in the same individual under different circumstances.

The results are, in many instances, remarkable, and may well give pause to those extremists who pin their faith for success in artificial infant feeding on minute changes in the percentages of the different ingredients.

Conclusions.—It is not possible to determine an average composition of breast milk at different stages of lactation.

Careful analysis is of great value, but, in order to reach definite conclusions in a given case, an average sample should be taken composed of (1) a specimen at the beginning of the morning nursing, (2) in the middle of the mid-day nursing, and (3) at the ending of the evening nursing. Marked changes may be produced in the composition of breast milk through modification of a woman's diet. M. NICOLL, JR.

VEITCH, A.: MALNUTRITION IN AN INFANT DUE TO EXCESSIVE PUTRESCENCE IN THE ALIMENTARY CANAL, SUCCESSFULLY TREATED BY LACTIC ACID BACILLI. (*British Medical Journal,* August 10, 1907, p. 319.)

A girl, aged four months, had been carefully dieted on pasteurized milk for some weeks, but had never thrived. Ingestion of food was followed by vomiting, and she was greatly emaciated. Patches of eczema were beginning to appear on the scalp. The stomach contents were examined bacteriologically. The colon bacillus and the lactic acid bacillus were absent, but there were found a large number of bacteria capable of producing putrefaction. The child was placed on condensed milk and improved slightly. Two weeks later a pure culture of the lactic acid bacillus was added to a pint of diluted condensed milk after boiling and cooling to blood heat. After standing some hours the milk was ready for consumption. Within one week vomiting had ceased and there was evidently an increase in weight. Later, cream was added to the soured milk. In seven weeks recovery was complete and the eczema had disappeared.

This case warrants the adoption of sterilized or pasteurized milk treated by pure culture of the lactic acid bacillus in all cases of malnutrition in children where intestinal decomposition is found to be excessive. A. W. BINGHAM.

EHLER, GEORGE W.: THE PHYSICAL EXAMINATION OF CLEVELAND SCHOOL CHILDREN. (*Annals of Otology, Rhinology and Laryngology,* June, 1907, p. 380.)

This work was begun in 1904, and the first report gave 33 per cent. of the children as having defective vision. They are now examined for vision, inflammations of the eye, headache and fatigue, hearing and running ears, kind of discharge, nasal obstruction, mouth-breathing and condition of the teeth. A report is sent to the parent and immediate consultation with a physician urged. Recourse is had to the juvenile court where the parents persistently neglect to follow the advice of inspection. A Board of School Hygiene has been instituted by the Board of Education which bids fair to place the school child in surroundings best suited to its normal growth and development.

S. W. THURBER.

EULENBURG, A.: SOME NEW METHODS IN THE TREATMENT OF EPILEPSY. (*Die Therapie der Gegenwart,* November, 1906, p. 485.)

The treatment of epilepsy has shown little progress compared with the methods of treating the functional neuroses and neuropsychoses, according to Eulenburg. An effort has been made to improve on the old bromid treatment by the following methods: (1) Balint's bromopan cure, a combination of the bromids with a special salt-free diet. The diet recommended by Balint is, however, deficient in caloric value. He uses a special bread called bromopan, which contains bromids instead of chlorids. (2) Another method is based upon the use of organic preparations of bromin, as bromipin, a fat compound of bromin; absorption takes place in the intestines, and gastric disturbances, acne, etc., are avoided. The liquid bromipin (33⅓ per cent.) can be injected in doses of 30 to 50 grams at intervals of four to five days in children. The author is satisfied with his results from the use of bromipin. (3) "Neuronal," experimented with by Rixen, is said to be only a palliative and is not indorsed. (4) The organotherapeutic method he regards as important; von Poehl's cerebrin (a mixture of glucosides obtained from fresh brains) may be given internally, or by hypodermatic injection. The author treated 22 epileptics with cerebrin. There were no cures, but the results were very satisfactory.

G. R. PISEK.

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Original Communications.

MENINGOCOCCUS HYDROCEPHALUS.*

BY FRANCIS HUBER, M.D.,
New York.

"Hydrocephalus" is not a primary disease. It is the terminal lesion of prior affections leading to an accumulation of serous fluid within the cranial cavity. The pathological condition is frequently, though not necessarily, associated with an enlargement of the head, an important point to remember. Referred to at times as dropsy of the brain or water on the brain, the affection may be acute or chronic, congenital or acquired. The etiology of the congenital cases has not been thoroughly elucidated. In regard to the acquired variety, we shall discuss but one form, the scope of our paper being limited to the consideration of cases complicating or following epidemic cerebrospinal meningitis. Councilman, and other excellent authorities, look upon the original trouble as a meningoencephalitis, rather than a meningitis. The anatomical changes are not confined to the meninges—they may, and often do, involve the superficial layers of the brain and its blood vessels.

The effusion, variable in amount in individual cases, may take place at the onset or at any time during the subsequent course of the disease. Under favorable circumstances it may be absorbed; on the other hand, it may be so extensive as to lead to a fatal issue or influence unfavorably the future mental and physical status of the patient.

The fluid may be limited to one ventricle, though more commonly it is found in both, or it may occur in the subarachnoid space. In other words, we may have an external hydrocephalus, an internal variety, or a combination of the two, external and internal. The treatment of the external form, of the combined external and internal, differs materially in principle from that employed or resorted to in the internal or ventricular class.

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* Read by title at the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 9, 1907.

The paper was prepared about two years ago, but was not presented, as we were awaiting the results of surgical measures resorted to in a series of cases by my colleague, Dr. H. M. Silver. The details of the various operations and the conclusions arrived at will appear later in a special article.

The symptoms vary with the age of the patient. The head may or may not be enlarged, the increase in size depending upon the condition of the sutures and fontanels. When ossification has taken place the head does not take on the rapid increase characteristic of cases in which the sutures, etc., are still open. The shape of the enlarged head is, furthermore, influenced by the degree and extent of the sutural union.

In the infant with open fontanel and sutures, within 1 to 2 weeks from the onset, the tense and bulging anterior fontanel, with diminution and even absence of pulsation in this region, directs early attention to the condition.

The veins of the skull become enlarged and prominent and the various cranial diameters increase more or less rapidly, depending upon the activity of the inflammatory process and the amount of fluid present. The younger the patient, the more pronounced the sutural separation, the larger the fontanel and the greater the general increase in the size of the head.

Though it does not reach the proportions attained in the congenital type, the weight and dimensions may be such that the cranium is no longer supported by the muscles of the neck, but falls to one or other side, or the chin rests against the sternum. It has been said, "the body appears but as an appendage to the large caput." The distended fontanels and widely separated sutures in the extreme cases form a wide-open membranous space, extending forward to the root of the nose, between the separated frontal bone and laterally as far as the temporal bones. The rest of the body suffers from nutritional disturbance and defective innervation. Emaciation associated with loss of muscular power is marked.

In the very young, the bones yield readily to the increase in the internal pressure and the head is uniformly enlarged. In older infants the shape will vary, depending upon the extent of the sutural union and the original conformation of the head. The nonunited portions yield readily and the greatest increase is in the direction of the least resistance. In keeping with this circumstance there may be a greater accumulation of fluid in the anterior or posterior cornua of the ventricles and a greater protrusion of the corresponding part of the brain, the more pronounced bulging being found in the frontal or occipital region respectively.

The orbital plates, depressed by the excessive effusion in the anterior cornua, form an obtuse angle with the body of the frontal bone. The position of the eyes is affected, being pushed downward and forward. The sclerotics exposed above, the iris and pupil being partly covered by the lower lid, gives rise to a ghastly expression from under the prominent forehead.

In the posterior basilar type, in addition to the corresponding prominence, there is marked retraction of the head, together with arching backward of the spine. In extreme cases the occiput and sacrum may be in apposition.

It is hardly necessary to say that characteristic nervous symptoms, to be discussed later, are present and form part of the clinical picture.

In cases where the head is normal or but little increased in size (the sutures, etc., having been obliterated before the onset of the original disease) we are compelled, in arriving at a diagnosis, to rely upon the nervous symptoms produced by the effused fluid.

Diagnosis may be more or less difficult.* The clinical manifestations are about as follows: Within a week or two from the onset of the cerebrospinal meningitis we notice, notwithstanding a rather low or irregular temperature, little or no improvement in the mental condition. The patient remains more or less apathetic or may be comatose. Recurrent vomiting is noticed and occasional convulsions occur. Emaciation takes place rapidly, the abdomen is markedly retracted, the pupils are dilated and the distended veins of the forehead and head become more or less prominent. Strabismus may be present. Stiffness and retraction of the head persist. The temperature is low or subnormal for days and weeks, or is elevated in a very irregular manner.

Wide excursions are also observed. In one of our recent cases a difference of 12°F. was recorded. Paroxysmal headaches and a hydrocephalic cry are common; pain in the head and neck may be continuous. Neuralgic pains in various nerve trunks are not uncommon.

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* Koplik teaches that the MacEwen percussion of the skull in children and adults in whom the sutures are ossified will enable one to detect at an early stage a hydrocephalic effusion into the ventricles. He has "found that a percussion of the head following MacEwen's method as to the position of the patient, which should be upright, with the head slightly inclined to one side, the percussion being performed at the pterion, is a most valuable means of discovering the presence of hydrocephalus internus." A hollow tympanitic sound is obtained when fluid is present.

In young patients the pulse is rapid; in the older it may be slow, full, intermittent or irregular in rhythm. Incontinence of urine and feces occurs particularly during the relapse. Various forms of muscular paralysis may exist. Muscular tremors of the face, tongue and extremities are frequently observed.

The unfavorable signs clear up now and then. The amelioration in the condition, though striking, unfortunately is too often but a delusive phase in the downward course. Consciousness may be regained, conversation become rational, the general nutrition improve and the sphincters regain their tone.

The general outlook appears to be bright; unexpectedly there is a return of the headache, coma, vomiting, with the other distressing symptoms, followed by a fatal termination in consequence of coma, respiratory failure, exhaustion or convulsions.

A number of exacerbations, with successive relapses, are apt to take place before death occurs.

The socalled cases of "acute dilatation" of the ventricles run their course within one to two weeks and even less; the more chronic may last for months and years.

Acute distention of the ventricles is not infrequent at the outset of the disease. Early in our experience and study of the cases at Gouverneur Hospital in the epidemic of 1904, it was found that, in a number, large amounts of cerebrospinal liquor, under considerable pressure, would escape when lumbar puncture was performed early. In a few instances, by relieving the pressure, life was unquestionably prolonged or a fatal issue prevented. In the greater number, however, no benefit resulted and the unfavorable course was not retarded.

Deputy Coroner Dr. O. Schultz was impressed, in a series of cases which came to autopsy after an illness of twenty-four to seventy-two hours, by the evident amount of compression of the cortex, apparently due to the increase of fluid in the ventricles.

Treatment.—As far as medicines are concerned, excepting possibly the iodides, no very gratifying results have been obtained. In some cases, nature has been kind, the process having been cut short before any great damage was done, and the patient continues to enjoy a fairly comfortable existence.

A limited number, notwithstanding the existence of hydrocephalus, grow up and show little or no mental change.

It is strange to what an extent the gray matter may tolerate the distention and displacement and yet continue to perform its functions more or less perfectly under the conditions of increased pressure and defective or impaired nutrition. In exceptional cases, where the disease has been arrested, the faculties may continue to develop and in time attain the average. Cases have been recorded of exceptional brightness.

Prof. Von Hauseman, of the University of Berlin, who has recently examined the brain of Theo. Mommsen, the historian, states that he, like Hermann Von Helmholtz, the physiologist, and Adolph Wenzel, the painter, was the subject of hydrocephalus. He suggests that on this basis an explanation may be offered of Mommsen's eccentricity, Wenzel's extreme irritability and occasional fainting fits, and the spasmodic seizures from which Helmholtz suffered (*Medical Record,* May 18, 1907, page 821).

In others, paroxysmal headaches, pains in various parts of the body, inability to engage in mental work, etc., are reminders of the attack. Idiocy, epilepsy, blindness, deafness, various forms of paralysis, etc., make such patients a burden to themselves and their families.

As to operative interference, but two procedures admit of serious consideration. First, lumbar puncture. Under aseptic precautions and with the necessary experience, Quincke's lumbar puncture is a comparatively simple and safe measure. The best results are obtained in cases in which the effusion is limited to the subarachnoid space; in other words, in cases of serous meningitis or external hydrocephalus. Schultz, of the Posen City Hospital, reports that he has found that the intellect is cleared, the appetite improved, cramps disappear and the sleeplessness and vomiting are arrested after lumbar puncture in the hydrocephalic stage of cerebrospinal meningitis (*New York Medical Journal,* June 15, 1907, page 1,136).

Such excellent results are exceptional in the experience of those of us who have studied the epidemic in New York.

Now and then a single lumbar puncture is followed by marked and rapid improvement in the symptoms. Whether this is a simple coincidence or a brilliant therapeutic result accomplished by intervention at the proper moment it is impossible to say.

I do not know of any sign or series of symptoms, a consideration of which will enable the observer to select this auspicious moment or predict the results in any case of lumbar puncture.

In the combined external and internal variety, lumbar puncture must be repeated at varying intervals whenever convulsions, paroxysmal headache, recurrent vomiting spells, increased apathy, etc., point to increased intracranial pressure. In some of our cases lumbar puncture was resorted to fifteen to twenty times; the highest amount withdrawn at one time was 85 c.c. Finally a "dry tap" may be noted. Fluid is not found, as the channels of communication between the ventricles and the arachnoid space have been obliterated or the structures at the base of the brain have become so adherent as to prevent the escape of fluid from the ventricles to the subarachnoid space. The pathological conditions have, therefore, transformed the case into the ventricular variety or internal hydrocephalus.

In cases in which, in addition to the effusion, there are marked evidences of cortical changes (maniacal attacks, epilepsy, paralysis, etc.), though we may remove the fluid we cannot restore the integrity of the nervous structures. Cushing's operation of draining the fluid into the retroperitoneal connective tissues has been performed a number of times, without any ultimate success, in the combined external and internal types.

Finally, we come to the internal type—ventricular dropsy or chronic internal hydrocephalus—in which the foramina between the ventricles and subarachnoid space have been closed by inflammatory processes. Lumbar puncture is of no avail in this variety, and we are consequently forced to resort to ventricular drainage, a surgical measure employed by my colleague, Dr. H. M. Silver, in a series of cases in the Beth Israel Hospital. In only one of the patients operated upon did we get any encouraging results. In a few, though life was unquestionably prolonged, the mental state did not present a corresponding degree of improvement.

Notwithstanding the unfavorable and poor results obtained in our cases, all late and progressively growing worse, the operative procedures ought not to be condemned prematurely, nor should they be considered in the category of "sins which, committed aseptically, are readily forgiven." We are dealing with a most unfortunate pathological condition. The various operations thus far devised and resorted to in advanced cases offer, it is true, but slight hope of cure. Perhaps an earlier diagnosis and an earlier resort to surgery, in selected cases, may give better results.

KERNIG'S SIGN IN INFANCY.—A STUDY OF TWO THOUSAND CASES.*

BY JOHN LOVETT MORSE, A.M., M.D.,

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Physician at the Floating Hospital, Boston.

Kernig read the paper in which he called attention to this sign before the St. Petersburg Medical Society in 1882, but it was not published until 1884. Almost no attention was paid to it, however, until Netter published his paper in 1898. Many articles were written on the subject during the next few years, but interest in it has recently diminished again.

It was at first supposed that this sign was not only pathognomonic of meningitis, but that it occurred so much more frequently in the cerebrospinal than in the tuberculous form that it was of value in the differential diagnosis between the two. It was soon discovered, however, that it was not only found in both forms of meningitis, but also that it was not present at all in some cases, or, if present, not present constantly. It was then found, moreover, that it was occasionally present in other diseases of the nervous system and sometimes in the acute infectious diseases, notably typhoid fever and pneumonia. Among the diseases of the nervous system in which it has been found are cerebral hemorrhage, meningeal hemorrhage, chronic encephalitis, hemiplegia, cerebral abscess and hysteria. It has also been found in uremia.

Kernig's sign consists in the inability to extend the leg fully on the thigh, when the thigh is at a right angle with the trunk, or to flex the thigh to a right angle with the trunk when the leg is extended on the thigh. Kernig originally made the test by having the patient sit on the edge of the bed with the legs overhanging and then attempting to extend the legs. Others modified the test by attempting to have the patient sit up straight in bed with the legs extended on the thighs. Osler, in 1899, called attention to the fact that the sign could be elicited as well with the patient lying on his back by flexing the thigh and leg on the trunk. Kernig considered that the sign was not positive unless the angle was 135 degrees or less. Others have placed the limit at 120 degrees, or even at 115 degrees. The angle of the thigh to the trunk is sometimes measured and sometimes the angle of the leg on the thigh. The latter is probably the more satisfactory method.

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* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 8, 1907.

Kernig's sign is an involuntary manifestation and is not accompanied by, or due to, pain. It should not be confused with the inability, or rather the unwillingness, to extend the leg in sciatica, the inability here being voluntary and due solely to pain.

This is not the place to discuss the various theories as to the origin of this phenomenon. It is safe to assume, however, that the cause is not the same in all cases. We shall probably not go far astray in accepting the statement of Sainton and Voisin that Kernig's sign is a reflex phenomenon resulting from the action of the excito-reflex cells of the spinal cord under various influences.

The majority of the 2,000 babies (that is, infants under two years of age) on which this study is based were seen in the author's private or consultation practice during the last five years; the remainder were patients on his service at the Infants' Hospital during the same period. They were consecutive except where this point was accidentally omitted in the physical examination. Kernig's original angle of 135 degrees was accepted, because after the first few months, with the exceptions to be noted presently, extension of the legs on the thighs is as complete and flexion of the thighs on the body more complete than in later life. The angle was in the beginning usually estimated between the thigh and trunk, but later between the leg and thigh.

There is, as is well known, normally a slight rigidity of the flexors in the newborn and a tendency for the extremities to take the intrauterine position. This physiological exaggeration of the muscular tone may be explained, according to Hochsinger, by the preponderance of the innervation of the posterior columns over that of the still undeveloped lateral tracts; the greater tendency of the muscles of the newborn to tonic contraction as the result of slight irritation; and the lesser inhibition from the higher centers. Even under physiological conditions, as during crying, this normal condition of flexion may change to a persistent tonic contraction. Hochsinger has described three forms of myotonia in infancy as the result of severe diseases of long duration, especially chronic diseases of the gastroenteric tract and congenital syphilis. In the first there are intermittent tonic contractions of the muscles of the extremities; in the second, persistent symmetrical spasm of the flexors of the hands and feet and stiffness of the flexors and adductors of the extremities; in the third, the muscles of the trunk and neck are involved, a condition resembling tetanus being the result.

This physiological and pathological rigidity of infancy must always be taken into consideration in testing for Kernig's sign at this age. In these conditions, however, the rigidity and flexion are present no matter whether the thigh is flexed or extended on the trunk. If the position of the leg on the thigh is noticed when the thigh is extended, no mistake should be made when testing for Kernig's sign, as in these conditions the angle of the leg to the thigh does not change when the thigh is flexed on the body. No rigidity sufficient to interfere with the testing for Kernig's sign was found, however, in 33 premature infants. Rigidity marked enough to prevent the obtaining of satisfactory results was found in 32 babies suffering from a great variety of diseases. These included 3 cases of septic infection of the newborn, 1 of dilatation of the stomach, 4 of chronic intestinal indigestion, 1 each of fermental diarrhea and gastroenteric infection, 6 of malnutrition and 1 of infantile atrophy. There were also 1 case of bronchitis, bronchopneumonia and pneumonia respectively, 2 cases of laryngismus stridulus, 5 of tetany and 5 of cerebral paralysis. There was, however, not only no rigidity but no Kernig's sign in 15 cases of laryngismus stridulus, 9 of cerebral paralysis and 9 of tetany. This rigidity, or myotonia, of infancy, whether physiological or pathological, occurs, therefore, so seldom during infancy that it interferes but little with the determination of Kernig's sign at this age.

Tenderness of the legs, whether about the bones or joints, prevents any satisfactory examination for Kernig's sign because of the pain which it causes. The most common cause of pain and tenderness in the legs in infancy is, of course, infantile scurvy. In many of the cases of scurvy the pain and tenderness entirely prevented the determination of Kernig's sign, while in others, in which they were less marked, they did not interfere.

Five hundred and seven of these 2,000 babies were perfectly normal babies, which were seen entirely with relation to the regulation of their food. No one of them showed a Kernig's sign. The others were suffering from a great variety of diseases, a list of which, exclusive of the diseases of the nervous system, follows:—

Acute gastric indigestion	74
Chronic gastric indigestion	142
Acute intestinal indigestion	68
Chronic intestinal indigestion	144
Infectious diarrhea	143
Intussusception	2
Prematurity	33
Infantile atrophy and malnutrition	100
Rickets	82
Laryngitis	13
Bronchitis	100
Bronchopneumonia	70
Pneumonia	85
Empyema	13
Diseases of the skin	26
Difficult dentition	24
Congenital stridor	2
Heat prostration	2
Acute nephritis	2
Pyelitis	6
Cervical adenitis	9
Otitis media	76
Congenital heart disease	24
Hemorrhagic disease of the newborn	3
Sepsis	7
Congenital syphilis	10
Diphtheria	8
Influenza	6
Whooping-cough	11
Chronic diffuse tuberculosis	25
Typhoid fever	1

A considerable number of those afflicted with the more simple conditions were, as far as the nervous system was concerned, normal infants. On the other hand, many of the babies with acute diseases of the gastroenteric tract were extremely ill and showed marked nervous symptoms. Many of those with chronic disturbances of the gastroenteric tract and of those suffering from malnutrition and infantile atrophy were extremely emaciated and in a condition where excessive rigidity might be expected. Many others also, who were very ill with other diseases, showed marked nervous symptoms. Kernig's sign was found, nevertheless, in only 2 of all these patients. These had pneumonia.

While Kernig's sign was found in 2 babies with pneumonia it was absent in 83 others, showing that even in this disease it occurs very rarely. The infrequency of its occurrence suggests that it may not be due to the pneumonia, but to some complicating cerebral condition, such as meningitis. While this may sometimes be the case, it is certain that these babies did not have meningitis. In the first baby, in whom Kernig's sign was slight on the right and marked on the left, the fontanel was depressed and no fluid was obtained by lumbar puncture; while in the second, in whom Kernig's sign was present for several days and who died in a convulsion, a perfectly normal fluid was obtained by lumbar puncture.

Kernig's sign was always absent in a considerable number of babies suffering with diseases of the nervous system. It was not present in 23 babies with convulsions in whom it was sought for either during or immediately after the cessation of the convulsion. It was absent in 19 idiots of various sorts, in 15 babies with laryngismus stridulus, in 9 with tetany and in 9 with cerebral paralysis. Rigidity of the extremities prevented the application of the test in a number of babies with laryngismus stridulus, tetany and cerebral paralysis. It was not present in 7 babies with chronic internal hydrocephalus, but was found in 2 others. This was the only disease of the nervous system outside of meningitis in which Kernig's sign was found.

Forty-three of the babies had meningitis, proved either by autopsy or lumbar puncture. Nineteen of these were of the tuberculous and twenty-four of the cerebrospinal form. The diagnosis of meningitis, based on the clinical course and symptoms, was made in 31 others, but was not proved either by autopsy or puncture. Twenty-one of these were of the tuberculous and 10 of the cerebrospinal form.

Kernig's sign was found in but 25 per cent. of the unproved cases, and in those cases there was no difference in the frequency of its occurrence between the tuberculous and the cerebrospinal forms. Only one examination was made, as a rule, in these cases. Kernig's sign was present at some time in 43 per cent. of all the examinations made on the proved cases. It was found more than twice as frequently in the cerebrospinal as in the tuberculous form. It was always present in 10 per cent. of the proved cases in which repeated examinations were made, always absent in 40 per cent., and sometimes present and sometimes absent in 45 per cent. Spasm prevented definite conclusions in the others. It was more often always absent in the tuberculous than in the cerebrospinal form. In 11 cases it was at times present on but one side.

An attempt was made to determine whether Kernig's sign occurred more frequently at the beginning, in the middle, or toward the end of the disease. The stage of the disease had no apparent influence, however, as it was found with almost equal frequency at all stages, both in the proved and in the unproved cases. In the tuberculous form, however, it was perhaps rather more common late in the course of the disease.

An attempt was also made to determine whether or not there was any connection between the presence or absence of Kernig's sign and the intracranial pressure, as shown by the level of the fontanel or the rate at which the fluid flowed out during lumbar puncture. In the proved series Kernig's sign was present in 40 per cent. of those in which the fontanel bulged, in 12½ per cent. of those in which it was level, and in 47 per cent. of those in which it was depressed. In the unproved series it was present in 26 per cent. of those in which the fontanel bulged and in 13 per cent. of those in which it was level. It was present in the only one in which the fontanel was depressed. Kernig's sign was present in 30 per cent. of the cases in which the pressure, as shown by lumbar puncture, was increased, in 45 per cent. of those in which it was normal, and in 22 per cent. of those in which it was diminished. These figures show, therefore, that there is no definite connection between the presence or absence of Kernig's sign and the degree of intracranial pressure. In some instances, moreover, Kernig's sign was always present, although the pressure, as shown by the level of the fontanel, was sometimes increased, sometimes normal, and sometimes diminished. It was also sometimes present and sometimes absent when the pressure, as shown by the fontanel, was either always increased or always diminished. It was also sometimes present and sometimes absent when the pressure, as shown by lumbar puncture, was constantly increased or constantly diminished. It was continuously absent in some infants when the pressure, as shown by lumbar puncture, was at times increased and at times normal. In one it was present when the pressure, as shown by lumbar puncture, was diminished and absent when it was increased.

The presence or absence of Kernig's sign was also compared with the condition of the deep reflexes as shown by the knee-jerk. It was present in 44 per cent. of the proved series in which the knee-jerk was increased, in 43 per cent. of those in which it was normal, and in 10 per cent. of those in which it was diminished. It was present in 29 per cent. of the unproved series in which the knee-jerk was increased, in 22 per cent. of those in which it was normal, and in 16 per cent. of those in which it was diminished. That is, Kernig's sign varied directly with the condition of the knee-jerk, being present more frequently when it was increased than when it was normal or diminished. The form of meningitis had no apparent influence in this connection.

CONCLUSIONS.

Kernig's sign is almost never found in infancy, either in health or disease, except in meningitis. It is found so rarely in other diseases at this age that its presence in an acute disease justifies, as far as any one sign can, the diagnosis of meningitis. It is never present, however, in some cases, and in many others it is present only intermittently. It occurs with equal frequency at all stages of the disease. It has no apparent connection with the degree of intracranial pressure. It is more often present when the knee-jerk is increased than when it is diminished. It is of no value in the diagnosis between the tuberculous and cerebrospinal forms.

DISCUSSION.

DR. KOPLIK.—As regards theory and practice, it is well to remember that this sign was discovered in practice. Dr. Kernig was passing through his wards one day when he noticed that some of the convalescents sitting on the edge of the bed, as he tested them for the reflexes, could not straighten the leg upon the thigh. In making this observation and following it up he developed this sign.

I agree with Dr. Morse that the sign, as a diagnostic element in forms of meningitis in infants under two years of age, is of very little clinical value. I have today in my wards a baby of nine months with cerebrospinal meningitis, in which lumbar puncture elicited only a few drops of cerebrospinal fluid, in whom Kernig's sign is not present. In tuberculuos meningitis its absence is the rule. At the bedside the objection made by the physician that the sign is not present in a given case, and therefore it is not meningitis, is very discouraging. I would, however, emphasize a little more than Dr. Morse the fact that the normal myotonic contractions should not be confused with Kernig's sign.

A CASE OF CONGENITAL BILIARY CIRRHOSIS (CONGENITAL OBLITERATION OF THE BILE DUCTS).*

BY J. P. CROZER GRIFFITH, M.D.,
Philadelphia.

Having reported to this Society a few years ago (ARCHIVES OF PEDIATRICS, April, 1905) a case of congenital obliteration of the bile ducts, I wish to put on record here the following report of a second case coming under my observation.

John Dugan, aged five months, was brought to the hospital of the University of Pennsylvania, December 2, 1906. The father and paternal aunts are said to have been jaundiced in early life, but no history of any serious condition could be elicited, and the statement, if correct, probably indicated icterus neonatorum. Labor was normal. The patient was the first child, and is said to have weighed 12 pounds at birth. He was always artificially fed. Jaundice is said to have been present from birth, and he soon began to lose weight steadily. He was treated for a time by Dr. Howard C. Carpenter at the dispensary of the Children's Hospital, and during that period, although his jaundice varied little, his weight for a time increased. There had been no vomiting at any time.

Examination on December 3d showed a considerable degree of emaciation, the weight being only 10 pounds; intense jaundice; several purpuric spots on the scalp; the heart and lungs negative; the liver decidedly enlarged to percussion; the spleen easily felt; slight tympanitic distention of the abdomen. The urine was of a greenish-yellow tint without albumin, sugar or casts, and with an active reaction for bile. Examination of the blood showed red blood corpuscles, 3,900,000; leukocytes, 14,040; hemoglobin, 68 per cent. The stools contained some dark material, apparently altered blood.

The child was in the hospital for five weeks, and during this period lost weight almost steadily, reaching, finally, 7 pounds and 14 ounces. He took food well and retained it, and there was no diarrhea, but the bowel movements after the first day or two became quite white and remained so. Examination of these on two occasions showed the entire absence of biliary coloring matter. Purpuric spots developed from time to time, but were few in number. His weakness increased, he cried little and was generally soporose. On December 23d a large blood cyst was noticed above the right ear. This suppurated and discharged later. Edema of the eyelids developed, although none was discoverable elsewhere. Jaundice deepened, the saliva and tears were bile-stained, and the urine collected just before death showed the presence of bile in large amount, and a trace of albumin, but no casts. Death took place on January 1, 1907. The autopsy performed by Dr. R. S. Lavenson was necessarily incomplete on account of the inability to obtain permission to remove any of the intestine. The following data are taken from his report:—

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* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, D. C., May 7, 1907.

The liver was found larger than normal, of a deep yellowish-green color, and of greatly increased consistency. The cut surface was somewhat granular, with numerous larger and smaller connective-tissue striæ running irregularly through it. The gall-bladder was entirely empty, collapsed and of a yellowish color. The cystic duct was apparently obliterated. The right and left hepatic ducts were patulous, but it was impossible to follow out the course of the common duct on account of the imposed conditions of the autopsy. Microscopical examination showed the typical lesions of biliary cirrhosis, there being an extensive increase of the periportal connective tissue with a proportionately great multiplication of bile ducts. The hyperplastic connective tissue in some instances invaded the lobule, but was in general confined to the periphery. In the center of the lobules there was some deposit of fibrous tissue of a younger and more cellular type.

The spleen was two or three times its normal size; its consistency slightly increased; its cut surface dark grayish-red, and the follicles grayish and rather more prominent than normal. Histologically there was a moderate hyperplasia of the lymphoid elements of the follicles with special richness of the pulp in blood and blood pigment.

This case is a very typical one of congenital biliary cirrhosis. The total obliteration of the cystic duct would not, of course, account for the jaundice. Unfortunately, it is impossible for us to know whether the common duct was obliterated in any part of its course, although it may be fairly presumed that this condition was present in view of the presence of this lesion in the cystic duct. As has been pointed out by writers, and as I have remarked in the report of my previous case, these two conditions, congenital biliary cirrhosis and congenital obliteration of the bile ducts, cannot well be considered as distinct diseases. In discussing my first case I referred to the two views held by writers. The first is that obliteration, immediately or finally complete, occurs in the bile duct and that a biliary cirrhosis develops as a sequel to this. The second view is that of Rolleston and Hayne, viz., that the cholangitis and cirrhosis develop at the same time within the liver, and that the former descends to the larger ducts and finally occludes them. As pointed out by Thomson, nearly all cases of congenital obliteration are attended by some degree of biliary cirrhosis. In my first case death occurred when the child was but a few days old. A complete obliteration of the common duct was found and the cirrhosis was slight. That case certainly indicated that the inflammation and final obliteration of the common duct was the primary lesion. In the case I now report it is impossible to tell which lesion was primary.

While it is probable, as Thomson claimed, that there is no case of obliteration of the bile ducts which is not attended by more or less biliary cirrhosis, it seems that the reverse of this is not true. Cirrhosis can occur without obstruction. One view advanced is that the cirrhosis is the primary lesion and that obliteration is the result of a descending cholangitis.

The cause of the condition is unknown, and very possibly varies with the case. It certainly seems probable, as Thomson has pointed out, that congenital syphilis is not an etiological factor. The diagnostic symptoms are acholic stools, bile in the urine, persistent jaundice often with hemorrhages, and progressive failure of health. Fever is not a necessary symptom. In the case now reported it was present more or less constantly, but was probably an accidental symptom.

The diagnosis of the disease is by no means easy. Icterus neonatorum presents no difficulty. Its short duration, with the presence of bile in the feces and its absence from the urine, serves to distinguish it. Jaundice dependent upon sepsis is not often so intense and persistent. There is fever, and biliary coloring matter is generally present in the feces. Generally some evidences of sepsis can be discovered. Obliteration, however, may be readily confounded with a simple catarrhal jaundice due to duodenal catarrh with its consequent swelling and obstruction of the exit of the common bile duct. Some degree of fever is liable to be constant in this condition, so that the absence of this symptom militates against the presence of catarrhal jaundice. I have, however, seen the diagnosis very perplexing. Only time will serve to make a satisfactory distinction. Another condition which may be readily confounded, and which is, indeed, very probably closely allied, is the congenital persistent jaundice described by Parkes Weber, which, as he believes, may be due to a partial obliteration of the bile duct which eventually disappears. I have referred to this matter in my previous communication and detailed a case which was certainly of this nature, although the family history had rendered the diagnosis of obliteration extremely probable.

With the advance of surgery it is to be hoped that perhaps the time may come when operative interference may be employed in the effort to save some of these cases. The difficulty is that such an operation so early in life would be of necessity an extremely dangerous one, and that it is impossible to determine in advance whether the condition is one which can be removed.

MUCUS IN VAGINA OF NEWBORN CHILD CAUSING RETENTION OF URINE.—Rudaux (*Annales de Gyn. et d'Obst.*, December, 1906) writes of a female infant which was seized with spasmodic attacks on the day after its birth. It was well nourished, weighing at birth 7¾ pounds. No urine had been passed, and the attacks were complicated by dyspnea, lividity of the face, and great restlessness. There was edema in the integuments of the hypogastrium and the hymen bulged forward, a soft body as big as a pea projecting from its orifice. On pressure being applied by one finger on the vulva forward, and another on the perineum, the soft body proved to be solid, pulpy mucus. Rudaux bent in two a stout piece of silkworm gut and used the loop for the complete extraction of the mucus through the narrow hymeneal orifice. Another loop was passed into the urethra, it brought away a little mucus, and immediately a jet of urine followed. Thenceforward micturition was spontaneous.—*British Medical Journal.*

THE CALORIC VALUE OF MODIFIED MILK IN ITS RELATION TO INFANT FEEDING.*

BY MAYNARD LADD, M.D.,

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The principles of percentage modification of milk in infant feeding have recently been subjected to severe criticism by certain writers, on the basis that the rules governing the change of formulæ are not founded on scientific principles, but upon clinical observation. Dr. Amberg, in his review of Dr. Cotton's new book on Pediatrics, is quoted as follows:—

"Further, the modern efforts to obtain a more scientific basis for the feeding of infants are neglected by the author. I need only call attention to the work of Heubner and Rubner, and of Schlossmann, in regard to the energy value of food and its significance. Unfortunately, the importance of these subjects has been lost sight of in the mutual admiration so common among American writers, and, instead of marching in the vanguard of scientific feeding, we, as American physicians, can hardly hold our own in this line of investigation."

Dr. J. J. Thomas, of Cleveland, commenting upon the passage, adds: "A hard blow to our pride, this, but the nail appears to be hit squarely on the head." The same writer quotes A. C. Croftan as saying that "It has been determined that a normal adult requires from thirty to thirty-five calories a day per kilo of body weight, and that these calories can be furnished by any or all of the three classes of food vicariously." Dr. Thomas adds: "If this be true of foods in general, as consumed by an adult, it is no less true of the limited kinds of food used by the infant."

It is true, as evidenced by the Transactions of the Society, that the caloric value of modified milk has not received the attention in this country that has been given it by German writers. It is reasonable that these strictures on American methods of feeding should be scientifically investigated. If the subject has been neglected, in my opinion, the cause has been due to a belief based upon clinical observation, which is not always "unscientific," that the nutrition of an infant depends primarily upon its power of digestion and assimilation, and not altogether upon the energy value of the food. Zahorsky, Morse and others have studied the caloric requirements of premature infants, but there have been very few data published in this country in regard to the caloric needs of babies in the first year of life, especially of those whose nutrition and digestion have been impaired by improper feeding.

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* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 9, 1907.

The object of this paper is to give the results in 20 infants who were carefully fed upon accurate modifications of milk, the caloric values of which could be closely estimated. Although the number of cases is comparatively small, certain inferences may be drawn in regard to the influence of the energy value of the food upon the weight development of infants in the first year.

A calorie, one may state, is the amount of heat necessary to raise the temperature of 1 kilo of water 1 degree (Celsius). If one knows the percentage composition of the modified milk given in an individual case, one may estimate its heat energy in terms of calories by assuming that in each 100 c.c. of the mixture each gram of fat equals 9.3 calories and each gram of proteids and milk sugar equals 4.1 calories. The sum of these calories multiplied by the number of cubic centimetres of the modified milk ingested in twenty-four hours and divided by 100 will, therefore, give the number of calories in the food consumed daily.

The twenty-four-hour amount of food varies according to the age and weight of the infant. It is, therefore, customary to express the food energy in the number of calories per kilo of body weight. This is called the energy quotient. For example, an infant weighing 8 kilos and ingesting 800 calories per day would be taking a food, the energy quotient of which would be 100.

One writer has stated that the calories could be furnished by one or all classes of food vicariously. If this is a fact, the energy value of modified milk is the most important consideration in determining the quality of an infant food and our clinical experience in feeding infants must have led us far away from the truth.

For example, the average caloric value of breast milk is 650 calories to a litre. This is based upon a composition of about 3.50 per cent. fat, 6.50 per cent. sugar and 1.50 per cent. proteid. A modified milk containing approximately 650 calories to the litre could be made by any one of the following prescriptions:—

	Fat.	Sugar.	Proteids.	Caloric Value.
1............	2.00	8.00	3.50	657
2............	4.00	6.00	1.00	659
3............	3.50	6.50	1.50	653

One who has worked intelligently in percentage feeding would not admit that an infant would thrive as well on formula No. 1 as he would on formula No. 2 or 3.

The proper proportion of water to solids in the food of an infant is also an important question connected with infant feeding which the study of the caloric value of the food does not take into consideration. The need of water, like that of the solid elements, varies according to the age, weight and digestion of an infant.

If a given infant required 653 calories per day, and was receiving it in the form of 1,000 c.c. of a 3.50 per cent. fat, 6.50 per cent. sugar and 1.50 per cent. proteids, the same number of calories in the food could be obtained by prescribing 500 c.c. of a 7 per cent. fat, 13 per cent. sugar and 3 per cent. proteids, but clinical experience teaches us that such a change would sooner or later cause serious disturbances of digestion and nutrition.

Those of us who have closely followed the percentage basis of feeding have been impressed by the differences in the power of infants of the same age and development to digest and assimilate food. Many factors contribute to these idiosyncrasies of digestion. The conditions may be such that for a number of weeks the nutrition of the infant is best served by supplying food of low percentages. Moreover, the power to digest the different elements of milk varies so greatly that in a difficult case of feeding we cannot determine the composition best suited to it by fixed rules, but must, by careful and deliberate experimentation, seek for the proportion of fats, sugar and proteids which will be best digested and assimilated. It is because each infant is a study by itself that it is extremely difficult to impart to others the secrets of successful feeding. If the question of infant feeding could be reduced to a definite number of calories per kilo of body weight, the problem would be greatly simplified. Can this be done? In the hope of throwing some light on the subject, the study of the series of cases here cited was undertaken.

One may approach the question in two ways. A given number of infants may be fed on formulæ, the energy quotient of which can be estimated and applied according to the rules laid down by continental authorities. The result can be judged by the subsequent gain in weight.

Another way, the one which I followed, was to feed, by the most accurate methods I knew, a series of cases, and then by calculating the caloric value of the food ingested during the months the infants were under my care, I was able to form an opinion as to the relation between the rate of growth and the number of calories taken.

The infants were without exception fed upon laboratory modifications of cow's milk. In the beginning of the treatment low percentages of fats, milk sugar, whey proteids and casein were tried, usually starting with 2 per cent. fat, 5 per cent. sugar, .25 per cent. whey proteids, .25 per cent. casein. As fast as digestion permitted, the milk was worked up to 4 per cent. fat, 7 per cent. milk sugar, .75 per cent. whey proteids and 1.25 per cent. casein. It was then changed to a 4—7—2, or 2.50 per cent. plain cream mixture, and, if at that time the infant was nine months of age, I often added from .25 per cent. to .50 per cent. of starch in the form of barley. The quantities at each feeding, the intervals between, and the number of feedings were regulated according to the general rules of feeding. Partial peptonization and milk of bismuth were practically the only medication used, and these aids were necessary in a few cases only and usually for short intervals. Particular pains were taken to prescribe the exact amounts at each feeding and the number of feedings to be given, so that the twenty-four-hour amount could be accurately estimated. The cases I have selected were those whose mothers could be trusted to observe and report intelligently. I believe, therefore, that there can be no error of importance in the calculation of the energy value of the food actually ingested. A small limit of error is inevitable, but it cannot be large enough to vitiate the conclusions which I shall draw. A similar limit of error applies to the work of most of the German writers, whose observations upon the caloric needs of infants are based mostly upon breast-fed infants and upon the assumption that breast milk averages 650 calories to the litre; whereas, in any individual case which was studied, the breast milk might have run considerably higher or lower than the average.

The infants were, with a few exceptions, when first seen, underdeveloped and subject to varying degrees of gastric and intestinal indigestion. The general character of the cases is best seen in the following table, showing the number of weeks each case was under treatment, the weight development at birth, the weight development when treatment was begun and the final weight development when the experiments were ended. The weight development was estimated by dividing the weight of the infant in question by the weight of the average healthy infant of the same age and multiplying by 100.

TABLE I.

Number of Case.	Number of Weeks under Treatment.	Weight Development at Birth.	Weight Development when First Seen.	Weight Development at End of Treatment.	Percentage Gain or Loss During Treatment.
1	14	123	80	72	— 8
2	11½	116	57	84	+ 27
3	14½	116	83	91	+ 8
4	9	116	70	88	+ 18
5	15	100 + (?)	83	81	— 2
6	13½	(?)	63	94	+ 31
7	10½	124	61	78	+ 17
8	14	100 + (?)	65	81	+ 16
9	11½	114	73	98	+ 25
10	13	110	93	88	— 5
11	7	(?)	70	85	+ 15
12	8	100 + (?)	58	80	+ 22
13	13	90	71	80	+ 9
14	28	103	58	100	+ 42
15	10	141	94	106	+ 12
16	31	100	70	90	+ 20
17	42	110	65	96	+ 31
18	34	100	106	110	+ 4
19	40	108	72	96	+ 24
20	8	96	55	68	+ 13

It will be seen that in all but 3 cases the gain in weight development was very marked, showing clearly the successful application of the principles of percentage feeding to these cases. In the 3 cases in which a loss was recorded, it will be noted by referring to Table II. that there was an actual gain in weight, but the gain was not sufficient to maintain the rate of growth of an average healthy infant of the same age.

Table II. gives the result obtained in my series. In order that the comparison of the rates of growth may be fair, I have arranged the cases in four groups corresponding to the first, second, third and fourth quarters of the year. The number of calories ingested daily is the average number for the quarter, not the mean between the highest and lowest. The rate of growth is expressed in a series of ounces gained per week. The number of weeks each infant was under observation is shown in Table I.

TABLE II.

Number of Case.	1st QUARTER		2d QUARTER		3d QUARTER		4th QUARTER	
	Average No. of Calories per Day.	Average No. of Ounces Gained per Week.	Average No. of Calories per Day.	Average No. of Ounces Gained per Week.	Average No. of Calories per Day.	Average No. of Ounces Gained per Week.	Average No. of Calories per Day.	Average No. of Ounces Gained per Week.
1	500	3.7	682	5.2	...	..	....	..
2	488	6.5	767	8.8	...	..	....	..
3	515	4.7	684	6.6	...	..	....	..
4	...	..	...	..	787	6.8	....	..
5	514	4.7	...	..	...	..	....	..
6	...	..	546	8.1	...	..	....	..
7	...	..	688	6.8	...	..	....	..
8	...	..	677	5.0	...	..	....	..
9	...	..	580	7.0	950	8.6	....	..
10	458	5.7	...	..	...	..	....	..
11	...	..	691	8.8	...	..	....	..
12	...	..	578	8.9	...	..	....	..
13	...	..	708	4.2	...	..	....	..
14	...	..	...	..	668	8.5	997	6.9
15	...	..	843	6.0	...	..	....	..
16	491	6.6	546	5.0	855	3.9	1,066	3.2
17	499	7.6	663	5.2	896	4.3	1,020	4.2
18	...	..	737	5.0	908	4.0	990	3.0
19	401	0.6	630	3.2	956	7.9	1,016	3.4
20	...	..	643	6.0	...	..	....	..
Ave.	483	5	666	6.2	860	6.3	1,018	4.1

In the first quarter the average number of calories per day in 8 cases observed was 483, with an average weekly gain of 5 ounces. With the exception of No. 19, which was a particularly difficult case to feed and one in which there was little progress for the first few weeks, the calories varied but slightly from the average, the lowest being 458 (No. 10) and the highest 515 (No. 3). In spite of this uniformity in number of calories ingested, the weekly gain varied greatly, No. 17 with a daily average of 499 calories gaining 7.6 ounces per week, while No. 1 with 500 calories gained only 3.7 ounces per week.

In the second quarter there were 16 cases observed. The daily average of calories was 666 with an average weekly gain of 6.2 ounces. That is, the average number of calories per day increased 38 per cent. and the weekly gain increased 24 per cent.

The lack of correspondence between the number of calories ingested and the weekly gain in weight is striking. The lowest daily average was 546 (Nos. 6 and 16), the first with a weekly gain of 8.1 ounces and the second with a gain of 5 ounces. The highest number of calories taken was 843 (No. 15) with a weekly gain of 6 ounces. This case, therefore, took 52 per cent. more calories than the minimum number in this quarter (No. 6) and gained 33 per cent. less per week.

Another interesting comparison in this second quarter is seen in Cases 2, 6, 11, 12, all of which made practically the same gain —8.8, 8.1, 8.8 and 8.9 ounces, although the daily averages of calories ingested were respectively 767, 546, 691, 578.

In the third quarter there were 7 cases observed. The daily average of calories was 860, an increase of practically 30 per cent. over that of the second quarter, but the weekly gain in ounces was almost identically the same, that is, 6.3 ounces as compared with 6.2 ounces.

As in the cases observed in the second quarter, the same lack of correspondence between the calories ingested and the weekly gain in weight is seen. For instance, Case No. 9 took 950 calories and gained 8.6 ounces per week, while Case No. 14 took 668 calories (30 per cent. less) and gained 8.5 ounces, or practically the same. Again, Case No. 19 took 956 calories and gained 7.9 ounces per week, while No. 18, taking 908 calories, nearly the same, gained only one-half as much—4 ounces per week.

In the fourth quarter there were 5 cases observed. The average number of calories ingested daily was 1,018, an increase of 18 per cent. over that of the third quarter. The weekly gain in weight was, however, only 4.1 ounces, a decrease of 35 per cent. as compared with that of the third quarter. Case No. 14, with a daily average of 997 calories, gained 6.9 ounces per week, whereas Case No. 18, with 990 calories, gained only half as much, that is, 3.4 ounces per week. Many other comparisons of a similar nature may be observed by study of this table.

The question might very properly be raised as to whether the discrepancies which I have pointed out between the daily number of calories ingested and the resulting gain in weight were not due to differences in the weight development of the cases which have been compared. I have, therefore, prepared Table III., showing the energy quotient (that is, the number of calories per kilo of body weight) and the weekly gains in weight. Examining the table, one sees that the results in the four quarters were as follows:—

TABLE III.

	1st QUARTER			2d QUARTER			3d QUARTER			4th QUARTER		
Number of Case.	Low and High.	Average Energy Quotient.	Weekly Gain in Oz.	Low and High.	Average Energy Quotient.	Weekly Gain in Oz.	Low and High.	Average Energy Quotient.	Weekly Gain in Oz.	Low and High.	Average Energy Quotient.	Weekly Gain in Oz.
1	55–151	112	3.7	136 149	143	5.2	......	....	....	......	....	....
2	97–129	112	6.5	120-142	131	8.8	......	....	....	......	....	....
3	88–131	116	4.7	124–137	129	6.6	......	....	....	......	....	....
4	......	....	....	......	....	....	95–153	118	6.8	......	....	....
5	87–129	113	4.7	79–129	....	....	......	....	....	......	....	....
6	......	....	....	79–129	107	8.1	......	....	....	......	....	....
7	......	....	....	143–170	152	6.8	......	....	....	......	....	....
8	......	....	....	110–145	127	5.0	......	....	....	......	....	....
9	......	....	....	83–101	93	7.0	101–141	131	8.6	......	....	....
10	71–126	111	5.7	......	....	....	......	....	....	......	....	....
11	......	....	....	108–138	119	8.8	......	....	....	......	....	....
12	......	....	....	125–160	135	8.9	......	....	....	......	....	....
13	......	....	....	133–163	146	4.2	......	....	....	......	....	....
14	......	....	....	......	....	....	91–147	123	8.5	108–146	122	6.9
15	......	....	....	106–139	112	6.0	......	....	....	......	....	....
16	98–127	115	6.6	113–126	119	5.0	112–137	123	3.9	129–140	134	3.2
17	138–153	145	7.6	111–153	127	5.2	111–144	125	4.3	115–127	120	4.2
18	......	....	....	89–109	97	5.0	98–103	101	4.0	99–106	101	3.0
19	68–136	105	0.6	128–175	152	3.2	132–165	153	7.9	120–130	126	3 4
20	......	....	....	151–165	159	6.0	......	....	....	......	....	....
Ave.	......	116	5	......	126	6.2	......	125	6.3	......	120	4.1

Although the energy quotients expressed as averages are fairly uniform for the four quarters, the rate of gain is seen to vary greatly. Moreover, if one will examine the individual cases there will be found to be as little correspondence between the energy quotient and the weekly gain as there was between the average number of calories ingested daily and the weekly gain in weight.

In the first quarter, No. 1, with an energy quotient of 112, gained 3.7 ounces per week, while No. 2, with the same energy quotient, gained 6.5 ounces, or 75 per cent. more.

In the second quarter, No. 11, with an energy quotient of 119, gained 8.8 ounces, while No. 16, with an energy quotient exactly the same, gained only 5 ounces per week, or 43 per cent. less. Again, No. 2 and No. 11, each gaining 8.8 ounces per week, the first had an energy quotient of 131, the second of 119.

Many other examples of the lack of correspondence between the energy quotient and the rate of growth may be seen by study of the above table. One will also observe that while the average energy quotients for the four quarters of the year do not vary greatly, the range between the high and the low levels in almost every case was very large. This variation is explained by the fact that the energy quotient is a constantly varying factor, inasmuch as it represents the number of calories per kilo of body weight. It is, therefore, an uncertain guide in infant feeding. If the number of calories taken in twenty-four hours remains the same, the energy quotient is constantly diminished as the weight of the infant increases. On the other hand, if the number of calories is increased and the weight of the infant remains stationary or increases but slightly, the energy quotient is increased. It bears no more relation to the rate of growth than does the average number of calories ingested daily.

Finkelstein states that breast-fed babies should receive food of an energy quotient of 100 in the first quarter, 100 to 90 in the second quarter and about 80 in the latter part of the first year. In artificially-fed infants the requirements are said by Heubner and others to be from 20 to 25 per cent. greater than the breast-fed infants. Czerny and Keller differ in this opinion and consider cow's milk and human milk the same in amount of energy required in digestion. The average energy quotient, as shown in Table III., would thus correspond only approximately with the averages given by the German authorities. The tendency in this series of cases indicates that the energy quotient in artificially-fed infants is much higher than in breast-fed infants and exceeds the standards generally accepted for bottle-fed babies by the German investigators. Moreover, the average energy quotient required in each quarter of the year varied so widely from the extreme low and extreme high quotients and bore so little relation to the rate of growth that one may seriously and with reason doubt the value of making it the basis by which to calculate the infant's food requirements.

CONCLUSIONS.

We are warranted in drawing the following conclusions, which I believe will be confirmed by the investigation of a larger number of cases:—

1. The calories in the food of an infant in the first year of life cannot be furnished by the fats, sugar and proteids vicariously if the best results of substitute feeding are to be obtained.

2. The number of calories required increases in each quarter of the year. In this series of 20 cases, the average number of calories ingested each day was for the four periods—483, 666, 860 and 1,018—while the corresponding energy quotients were 116, 126, 125, 120.

3. A given number of calories per day does not necessarily cause the same rate of growth in infants, even if they are of the same age and development.

4. A food of a given energy quotient does not necessarily cause the same rate of growth in infants, even if they are of the same age and development.

5. The caloric value of the food expressed either in terms of the number of calories ingested daily or as the energy quotient is not the most important consideration in determining the quality of an infant's food. The nutrition of an infant depends primarily upon its power to digest and assimilate milk. These functions are best served by modifying the percentages of the constituents of milk so as to adapt the food to the individual needs of the infant. In a given case, neither the number of calories nor the energy quotient of the food can be positively determined by rule, but, like the fats, sugar and proteids in percentage feeding, must be ascertained by experiment. The calculations of calories and energy quotients in connection with percentage feeding can be easily made, but they add nothing in the way of information which cannot be obtained by careful observation of the gastric and intestinal functions and the weekly gain in weight.

DISCUSSION.

DR. MORSE.—It is very hard to understand, I think, how anyone who is familiar with both the American methods of feeding and the German methods can feel that everything is wrong with the American and everything right with the German. It seems to me that if it were necessary to choose between the two that the American methods are the better. The common sense way, however, is to pick out the good points in both methods and use them both. Personally, I believe that in order to get the best results it is necessary to prepare the food by percentages, and that the food must be regulated to suit the individual infant's digestion. Something more is necessary than to provide the proper number of calories, although, of course, no method of feeding can be successful that does not provide this number. I have been in the habit for a long time of estimating the caloric value of the food from time to time, chiefly to make sure that in difficult cases of feeding I have not gotten the caloric value of the food too low, the tendency being to cut the strength of the food down on account of the feeble digestion until it does not contain enough for the baby to gain, or even live, on. In such cases the use of calories as a check is extremely important. A point to be remembered is that the caloric needs of a baby depend not only on his weight but also on its surface area, and that of the two the latter is the more important. It is also necessary to remember the nitrogen need of the babies. The food, therefore, must contain a certain amount of nitrogen and consequently a certain amount of proteids. They cannot gain if the nitrogen is too low, even if the caloric value is sufficient.

DR. KOPLIK.—I think this problem of calories is a very difficult one to understand and to give full justice to both sides of the subject. I do not think anyone has ever contended that all that was necessary was to give a baby a certain number of calories. The contention was that given a certain amount of surface area, a certain weight, a certain caloric equivalent in the food, a certain caloric coefficient for the baby to thrive was necessary. The workers in this field never contended that all that was necessary was to calculate a food in calories and then feed the baby with it. Dr. Ladd has gone to the pains of calculating the caloric equivalent of the food in his cases and has tabulated it very well, but that is only one side of the question. He has been surprised to find that if he gives 500 caloric equivalents in one case and 499 in another that the gain in one may be twice as much as in the other; that is not surprising. In these particular infants the waste of energy in assimilating a food which contains 500 calories as compared to one with 499 is twice as great in number 1 as in number 17. Dr. Ladd has not taken this into consideration at all; he has not taken into account this wasted energy in the gut. There is one thing about the calculation and estimation of these equivalents that is important, and that is that there is always in all infants, whether breast-fed or fed with cow's milk, a certain amount of nitrogen waste in the gut which is absolutely undeterminable. There is a nitrogen deficiency which doesn't appear in the feces. Dr. Wentworth has made a point of that in his previous communications. Another point is this: percentage feeding is not the only way of feeding a baby successfully. There are other methods of feeding which are highly successful, not only abroad, but in this country, and these methods are very widely diverse from the percentage method. I will mention one—the buttermilk method. Why is it such a successful method? Because it contains a very highly assimilable form of proteid, and the caloric equivalent of buttermilk is not only equal to, but sometimes above, that of mother's milk and the energy waste in the gut is small, much less than in any other form of feeding in the particular infant which thrives on it. If the same infant was fed by the percentage method and did not thrive, and did thrive on the buttermilk method, it simply proves that there are two forms of feeding, in one of which the amount of work expended in elaborating the food in the gut is less than in the other, and therefore there are more calories saved which go to increase of body weight in one food than in the other. Even though the percentage food contains more calories than the buttermilk, the waste in the gut in elaborating the food is less and the gain of the baby more with the buttermilk. Each baby must be studied out for itself.

DR. FREEMAN.—It seems to me there is one great advantage in the dissemination of our knowledge of this German method, and that is that it establishes a standard of food value ordinarily necessary for proper nutrition. It has been our tendency, I think, to feed a baby persistently on too little food, especially in the use of proteids of less than 1 per cent. If some attention is paid to this German method we will have better standards and there will be less starvation in order to get good stools.

DR. LA FÉTRA.—I wish to emphasize the points made by Dr. Morse and Dr. Freeman. It seems to me that in the use of the calories it would be enlightening if we could determine the lower limits of the caloric value to be supplied by the proteids; to determine the lowest limit of proteids which we can safely allow, and then the lowest limits of fats and carbohydrates. The upper limit we have to determine by the digestive capacity of the baby. There is so much more waste in some babies than in others. We should establish a limit below which we may not go in the proteids used in our milk modifications.

DR. ROTCH.—I think one great mistake I have noticed creeping into the discussions of this society is that when anyone reads a paper on feeding they are supposed to be giving an ideal method. We have no ideal method. There are a great many different methods. So far as I can see those who believe most in percentage feeding in no way believe that that is the only way, or the ideal way, or that they can manage their cases with that method alone, but there are a good many sides to this question. I do not believe that some of these caloric values have been at all established. All methods should be used. I believe that the principles of percentage feeding are employed everywhere, but here in America we have brought them down to a greater simplicity, which is not the case in Germany. They ignore what we have done; we have never ignored what they have done at all. Our more exact methods with percentage feeding will aid in establishing caloric values. What I do think is that we have the proper principle to start with. We must use percentages. Buttermilk does not agree with every baby and must be modified until it does agree. This society should acknowledge by this time that there is at least a principle in percentage feeding. That does not mean that it need be spoken of as the only method of feeding, or the best method. Changes must be made according to the idiosyncrasies of the babies. What we insist upon is that the method be exact, that is all. I agree with Dr. Koplik that we should make use of what the Germans teach us, and I think we do. We are not opposing caloric feeding at all, but we can show the weak points in the method.

DR. LADD.—I was obliged to cut the paper short and did not have an opportunity to say anything bearing on the points mentioned by Dr. Koplik. . The cases were successful as far as the feeding was concerned, but if the tables are carefully examined in reference to the German standards one will find that the calories taken were considerably in excess of the standards set by the Germans. They varied greatly in different infants of the same age. There is in these cases no fixed relation between the gain in weight and the calories taken. The unreliability of taking the energy quotient as a standard of feeding is also shown. With such discrepancies as are here demonstrated how can one say in a given case what the energy quotient should be?

THE TONGUE IN MONGOLISM.—Thomson (*British Medical Journal,* May 4, 1907) states that while nearly all the other peculiarities which distinguish the so-called "Mongol" baby from other children are recognizable from the day of birth, yet the condition of the tongue forms a notable exception to this rule. The tongue may be abnormally long, but the enlargement of the papillæ does not appear until after the second month, and the fissuring not until the third or fourth year. Tongue-sucking is a well-recognized characteristic of Mongolism, and to it the author is inclined to attribute the changes in the tongue.—*New York Medical Journal.*

PERIPHERAL PHLEBOSCLEROSIS IN CHILDHOOD.*

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AND

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In a recent communication to the Association of American Physicians, one of us, in conjunction with Dr. J. C. Meakins, drew attention to the frequency with which peripheral phlebosclerosis occurs, not only where arterial sclerosis exists, but independently of any other pathological process, and very commonly in young adults.

These observations were confirmed not only by clinical observations (inspection and palpation), but also by microscopical examination of excised portions of affected veins, those most commonly diseased being in the lower extremity, especially the saphenous veins.

The condition is due, in most cases, to a proliferation and hyperplasia of the intima and media, and is usually unaccompanied by signs of acute inflammation, so that the picture presents more the appearances found in ordinary atheroma of the aorta in its earlier stages.

During the past few months we have continued observations chiefly among young persons, and have been surprised with what frequency a similar condition may be found in children at almost any age, though those between four and fifteen years are the subjects of these remarks.

We first examined six children (four to thirteen years of age) with a view to getting histological specimens, and in several of these found the condition as illustrated in the accompanying photographs. In two of the cases the following facts may be added as a text to the illustrations:—

CASE I. Crombie. Aged thirteen years. Convalescent typhoid. Ill six weeks, with uninterrupted recovery.

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* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 9, 1907.

There was no previous history of rheumatic fever, nor did his present condition show signs of any other lesion of the circulatory system.

Examination of the peripheral veins, especially the internal saphenous, showed marked thickening, the vein feeling like a whipcord from the foot to the thigh. A small portion was excised at the level of the malleolus, and after hardening was stained with hematoxylin and eosin. As will be seen from the photographic reproductions (Figures 1 and 2, high and low powers) there is comparatively little lumen left in the vessel, owing to the extreme hyperplasia of both media and intima. The amount of small-celled proliferation is likewise small, while, on the other hand, there are many evidences of hyalin degeneration.

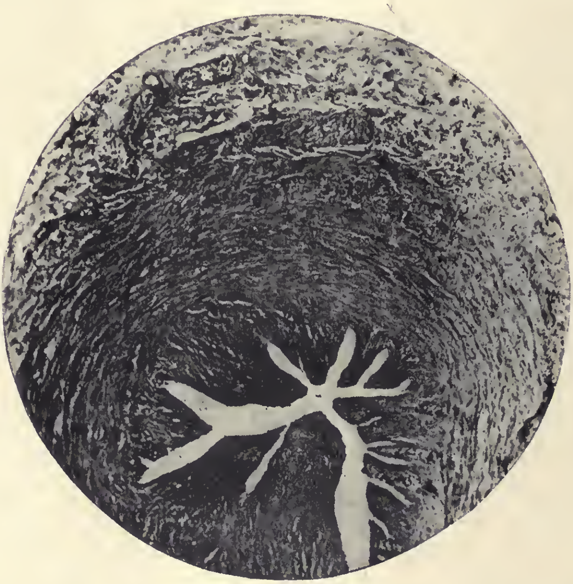

Fig. 1. Section of sclerosed saphenous vein from child, showing narrowed lumen from hyperplasia of intima and media (low power).

Case II. Belair. Aged twelve years. Congenital cardiac disease (pulmonary stenosis with mitral stenosis and regurgitation).

Patient had been a "blue baby" at birth and cyanosis had persisted. Later there appeared dyspnea, cough, choking sensations and occasional hemoptysis. He had had measles, pertussis and scarlet fever, making a good recovery in each instance. There was a family history of cardiac disease (acquired and congenital).

The patient on admission was well nourished, markedly cyanosed, but had no edema. In the lungs there was some emphysema and the bases were congested. There was no hydrothorax. The heart showed evidence of lesions at both the mitral and pulmonary orifices. The veins were markedly thickened, especially those in the lower extremities. The excised portions did not feel as hard as others we have seen, and yet the sections showed marked proliferation of the media and intima. (Fig. 3.)

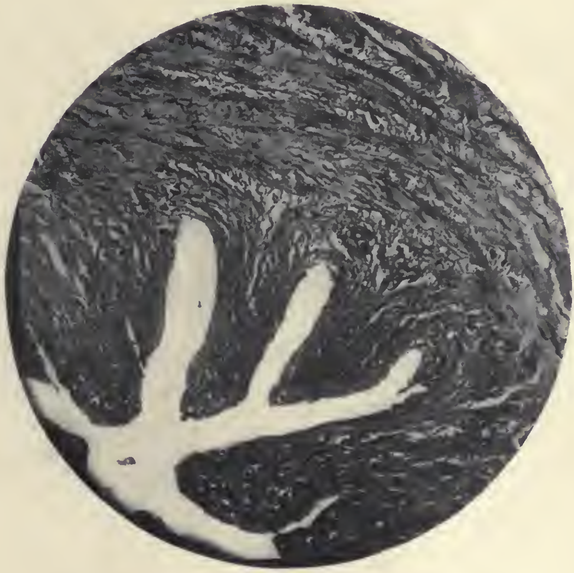

Fig. 2. Same section as in Fig. 1. Higher power. Showing patches of hyalin degeneration and absence of signs of acute inflammation.

Dr. Fry kindly examined, at our request, some 30 children at the Ladies' Benevolent Institution in Montreal, and found in 12 of these, all under fifteen years, definite signs of phlebosclerosis. The veins of the legs, chiefly in front of the internal malleolus, were thickened and cord-like and could be rolled under the finger in a way similar to sclerosed arteries, though to a much less degree.

These children were all in excellent health, were actively engaged in the ordinary occupations of the institution and had in no case had previous prolonged disease. In some the veins of the arms were also involved.

Dr. Fry likewise observed the same condition in 6 out of 12 children at the Royal Victoria Hospital, all of them being ill—3 with chronic endocarditis, 2 with chorea, 1 with typhoid fever, and 1 with acute rheumatic polyarthritis.

The blood-pressure in all of these children varied but little from the normal.

As in these cases, so in numerous others the superficial veins, chiefly in the legs and less so in the arms, showed frequent sclerosis, though it would seem, from the few examinations made at autopsies on children, that the visceral veins are not affected in the same way.

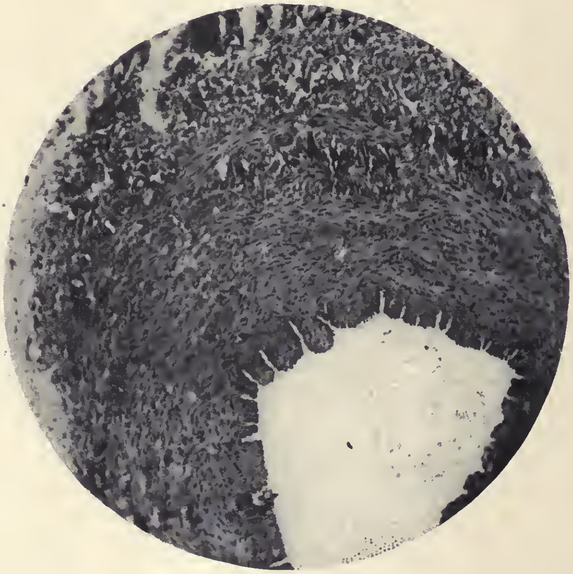

Fig. 3. Section of saphenous vein of child (high power). Note the thickened intima and media, and the comparatively slight evidence of small-celled infiltration.

The condition, whatever be its cause, is neither uncommon nor productive of clinical symptoms, though one would be led to conclude that in prolonged fevers there would be a greater liability in these veins to marantic thrombosis.

REPORT OF CASE OF CHYLOTHORAX IN A CHILD.*

BY CHARLES GODWIN JENNINGS, M.D.,

AND

HERBERT M. RICH, M.D.,

Detroit.

The child was brought to St. Mary's Dispensary on June 1, 1906, with a complaint of rapid and difficult breathing. He was then nine months old, the first child of healthy parents, and he had been well until about six weeks before, when he had a hard cold. It probably terminated in pneumonia, from the mother's story, although not so diagnosed. The rapid and difficult respiration had come on soon after this, and had thus continued for about four weeks at the time the child first came under observation.

Examination revealed the presence of fluid in the right pleural cavity. Upon tapping, 30 c.c. of a milky fluid were removed. The nature of this fluid will be considered later.

The child at this time weighed 20½ pounds, and fortunately the mother was able to nurse him until he was fifteen months old. By careful management he has been kept well, and now weighs 26½ pounds, having gained in the eleven months about 6 pounds. During this time the pleural cavity has refilled at regular intervals and paracentesis was performed on the following dates:—

May,	25,	1906,	30	c.c.—for diagnosis.	
"	29,	"	12	ounces.	
July	6,	"	18	"	
August	13,	"	24	"	
September	6,	"	12	"	Dr. T. B. Cooley (not emptied).
"	15,	"	24	"	
October	22,	"	23	"	
"	29,	"	24	"	(Reappeared in two days.)
November	24,	"	25	"	
December	21,	"	24	"	Dr. Cooley.
January	22,	1907,	28	"	
February	16,	"	27	"	
March	25,	"	28	"	

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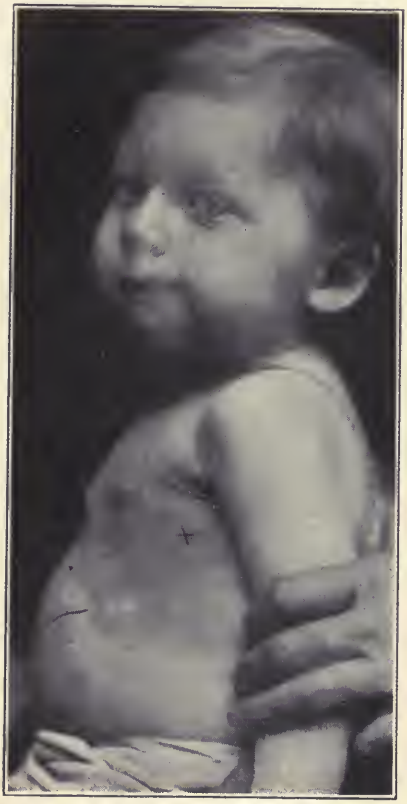
* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, D. C., May, 1907.

April	5,	1907,	24 ounces.	(Abdomen.)
"	16,	"	24	"
May	3,	"	26	"
"	14,	"	22	"

This makes seventeen times in the eleven months.

THE PHYSICAL SIGNS.



PHOTOGRAPH OF CASE OF CHYLOTHORAX, SHOWING THE DISPLACEMENT OF THE LIVER AND THE HEART.

X marks the apex beat of the heart. The black line at the left shows the lower border of the liver.

The signs in this case were not unusual except in their exaggeration, caused by such a large amount of fluid in the chest of a small child. The photograph shows the displacement of the liver and heart. There was great compensatory emphysema of the left lung, and an interesting observation was that as this compensation proceeded the rate of the respiration was lessened during the time when the fluid was present. Recently this rate has been as low as 38, where in the beginning it was rarely below 60 and frequently was 80. Pressure symptoms were also gradually eliminated when in the upright position. When lying down, however, the dyspnea and cyanosis still persisted when the amount of fluid approached its maximum.

FEVER.

From the time when first seen until about December 1st, six months, there was a daily rise of temperature, the range being 99° to 100.6°. On October 8th 0.1 mg. of tuberculin was injected. This was followed by successive and increasing injections, up to 4 mg., at intervals of three days to two weeks. There was never any temperature evidence of reaction to these injections, but about this time the temperature disappeared and was not again noted.

THE FLUID.

To the naked eye the fluid closely resembled milk—a white fluid upon which a layer of yellowish fat arose upon standing. The reaction was alkaline or amphoteric. The specific gravity varied from 1.008 to 1.020. The fat varied from 3 to 4 per cent., and proteids from 5 to 8 per cent. Sugar was repeatedly tested for but never found.

The microscopical picture was unique. The fat was in such a fine state of division that it resembled, under the microscope, a hanging drop of an emulsion of living bacteria. There was pronounced Brownian motion. The fat was easily demonstrated. By shaking with a little ether the fluid became entirely clear.

TREATMENT.

In addition to the tuberculin injections already mentioned, and careful symptomatic treatment for intercurrent difficulties, the child took, over a period of several months, syr. iodid, iron and nuclein.

LATER NOTE.

On May 21st the fluid again appeared in the chest, but as there was very little embarrassment it was allowed to remain. This fluid gradually became less, and on August 14th there was a small amount in the pleural cavity. On October 21st, practically five months after the last appearance of the fluid, the child was again brought in with the right pleural cavity completely filled. On October 25th the dyspnea became so urgent that it was again necessary to tap, 32 ounces being removed. The specific gravity of this fluid was 1.014 and the fat about 6 per cent. The child now weighs about 29 pounds.

November 1, 1907.

THE USE OF TRACTION IN THE TREATMENT OF HIP-JOINT DISEASE IN CHILDREN.*

BY EDWARD J. WYNKOOP, M.D.,
Syracuse, N. Y.

The occurrence of tuberculous disease in the hip joint of a child is an event which elicits great anxiety not only from the parents, but also from the physician, for it may be the starting point of a general tuberculous invasion. In the mild cases it means months of care and constant watching before a cure is effected, while in the severe cases the ravages of the disease usually cripple these unfortunates for life.

The thought comes at once to the physician who has just examined a child and found tuberculous disease present in one hip, "What measures can be immediately undertaken to check the inflammation in the infected parts?" He must also bear in mind these facts: "that the hip joint is surrounded by strong muscles in a state of spasm; that the spasm influences the position of the limb and causes deformity; that it increases the pressure within the joint; and lastly, that the hip joint, owing to the mobility of the pelvis and spinal column, is difficult to fix."† There seems to be a tendency in medicine oftentimes to neglect important facts and cast aside absolutely old and tried methods of treatment in order to take up newer ones, only to return to the well-beaten paths again as the pendulum of popular approval swings back. For years, traction, under proper conditions, was looked upon as being the correct method of treating hip-joint disease in the acute stage.

Not long ago, however, some prominent teachers considered traction unimportant, and fixation the thing desired in these cases. They claimed that fixation accomplished as much as traction, and that in applying traction only fixation was accomplished and that the inflamed joint surfaces could not be pulled apart.

Some German surgeons insisted that with the diseased thigh fixed in a properly-fitting plaster cast, a child was better off, up and around and walking on the diseased limb. By so doing, this was supposed to favor the early formation of bony ankylosis. The early history of almost every case of tuberculous hip disease gives these clinical facts: At first, limp, muscular spasm, pain, usually referred to the knee, abduction, apparent lengthening, together with night cries—all of which point conclusively to the fact that an acute inflammation of a tuberculous character is present in the joint. The presence of a tuberculous inflammation in the joint means that every effort must be made to prevent the spread of the infection and to favor the return of the diseased joint surface to a normal condition as promptly as possible. In a series of experiments carried on by Bradford and Lovett, it was proven beyond doubt that traction properly applied to a diseased limb, with pelvis and spine fixed, would cause distraction or separation of the head of the femur from the acetabulum. Thus traction would prevent not only widening of the acetabulum, but also absorption of the head of the femur from pressure due to the spasm of the muscles. These experiments were carried on both with diseased limbs and with healthy limbs and most accurate measurements were taken, and in every case distraction actually occurred. How many times has the attempt been made by the sick child to cause a separation of the diseased surfaces by overcoming muscular spasm in pushing upon the dorsum of the foot of the diseased limb by the well one, or by slipping the foot of the diseased limb between the rounds at the foot of the bed and then pushing the body toward the head of the bed with the well limb, thereby exerting traction on the diseased joint! Fixation while properly applied may be of great benefit, yet it does not separate the inflamed joint surfaces; and, where this separation does not occur, is not marked shortening, with deformity, much more liable to occur, and also bony ankylosis?

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* Read before the Syracuse Academy of Medicine, June, 1907.
† Bradford.

Traction has two objects—to overcome spasm of the muscles and to separate the inflamed joint surfaces.

Traction is, therefore, of the greatest value in the acute stage before shortening has occurred or abscess formed with accompanying destruction of bone tissue. In order to be effective, traction must be applied with the greatest care. In almost every instance failure to secure good results from traction is due to the improper mode of the application. In order to make traction effective these rules must be followed:—

(1) Sufficient weight to overcome muscular spasm.

(2) A properly applied counter-extension.

(3) Traction exerted on the thigh and not on the knee.

(4) Absolute fixation of spine and pelvis, always best accomplished in the recumbent position.

(5) Traction in the line of deformity.

The neglect of any one of these rules invariably means failure.

Too frequently insufficient weight is used, and the rule laid down by Powers, of London, is a good one to use as a basis.

One pound for each year up to two years, after that ½ pound to be added for each year. Usually it is necessary to increase beyond this, for many failures are recorded from insufficient traction force.

Counter-extension should never be neglected, and with counter-extension the lateral traction of Phelps is also of great value in these acute cases by helping to overcome the muscular spasm. The lateral traction is used in conjunction with longitudinal or direct traction, and the weight required is oftentimes greater than that used for the direct pull. The danger here is that rather too little than too much traction will be used.

Care in making traction above the knee and not below the knee needs no further consideration, for all are familiar with the dangers incident to traction upon the knee joint.

In reviewing the work coming under the writer's observation, it has seemed that more trouble has been encountered from lack of attention to proper fixation of pelvis and spine than to any other one condition.

The placing of a child with hip disease in a splint, cuirass, or Bradford frame, does not necessarily mean fixation of pelvis and spine. Only where the most exact care is used and attention to every minute detail insisted upon, will the surgeon have satisfactory results in absolute fixation of spine and pelvis.

No matter what apparatus is used it must be made to fit properly and to hold when fitted.

Traction which fails to pull in the line of the deformity practically means no pulling at all. After the proper application of traction for a certain period, other methods can be used, for traction is not necessary throughout the entire course of the disease.

The surgeon should be most persistent in trying to secure a cure without marked deformity. By early and efficient treatment most of these cases ought to have as a result a useful joint, with but little shortening of the limb.

The arguments put forward by Bradford in favor of traction, in an article published by him in the *Journal of Orthopedic Surgery* for January, 1906, are as follows:—

(1) In all pathological specimens of hip disease, evidence of pressure crowding the head of the femur against the acetabulum is found.

(2) In patients suffering from hip disease in an acute stage an exaggerated muscular irritability, or state of muscular spasm, exists, which crowds the head of the femur against the acetabulum.

(3) In bone disorganized from the ostitis, the violence of frequent contusion, or the crowding of one inflamed surface against another, is *not* favorable to healing.

(4) In the treatment of hip disease, a force which will counteract muscular spasm and draw the head of the femur away from the acetabulum, favors correction, prevention of deformity and more rapid healing of the diseased bone tissue.

(5) Experimental and skiagraphic evidence demonstrate that a traction force can be applied which will not only entirely overcome the spasm of the muscles about the hip, but will also, unless ankylosis has been established, draw the head of the femur away from the acetabulum.

(6) Clinical experience has shown the advantage of a *traction* force in the treatment of hip disease, applied for the purposes of distraction during the active stage of the disease.

(7) Traction is not needed during the whole period necessary for treatment, but only during the state of acute muscular spasm.

(8) During the ulcerative stage, both fixation of the joint and strong traction are needed. In the convalescent stage, a limited motion of the joint is not injurious, but protection from violence is essential until the bone tissues have regained their normal strength.

The principal object of this paper is to try to show the advantages of traction over simple fixation in the acute stage of tuberculous hip disease in children and reasons for such advantages. The necessity for an early and accurate diagnosis in children suffering from hip-joint disease is most essential in the securing of good results with any form of treatment. Treatment should always be begun as soon as the diagnosis is made and strict attention given to every detail; thereby many unfortunate complications are avoided. The surgeon must always bear in mind the pathological changes which occur in an infected hip throughout the long months during which treatment is necessary, and bear in mind also that not a shortened limb, with ankylosis, or a bad deformity is the object sought for, but a useful joint with but little or no shortening. Even where there has been good control of the patient, and every detail in regard to treatment has been attended to, shortening will occur, but better results can be attained if in the early stages we combat every advance of the disease by proper and persistent treatment. Though the child may be obliged to spend months in extension, in the recumbent posture, if in the end a useful joint results with little or no shortening, this is much better than for the child to be up and using the limb before the acute stage is over, running the risk of abscess formation and possibly excision. Is it not much better, then, when having these cases first brought in for treatment, to consider time spent on the back, with traction, well spent, rather to look to the clearing up of all acute symptoms before allowing the child to be up and around with a brace; in fact, to work steadily on the side of conservatism in order to secure a good useful joint and limb than to neglect early and proper treatment and to have to resort to excision as a means to save life?

There are cases which resist proper treatment and in which only fair results will be obtained, but, even in these, constant and persistent efforts must be used.

My object is not to place traction in the list of cure-alls, but simply to emphasize its importance and its great value when properly applied. It holds by the right of clinical and pathological findings a most important place in the treatment of the acute stage of tuberculous hip disease of children.

210 James Street.

ON CRIBBING.—Adler (*Münch. Med. Woch.,* No. 4, January 22, 1907) recommends warmly Bouveret's method for the treatment of cribbing, which consists in the wearing of a plate which holds the mouth open. This effectually prevents the swallowing of air. The plate is to be removed during meals.—*Boston Medical and Surgical Journal.*

CARBOHYDRATE INCAPACITY IN INFANTS AND YOUNG CHILDREN.*

BY CHARLES GILMORE KERLEY, M.D.,

New York.

In the ten-minute paper which your chairman has asked me to prepare, there will be time only to discuss the commonly used soluble carbohydrates—cane sugar, milk sugar, maltose—and the insoluble carbohydrate—starch. The results of clinical observations drawn from my own work without theories will be given.

Sugars.—Among the sugars, the most usual manifestation of sugar excess or sugar incapacity is regurgitation between the feedings. This is particularly apt to happen if cane sugar is used. Maltose may produce this symptom, but in less degree. The capacity for milk sugar is greater than that for maltose or for cane sugar. It is assimilated with less disturbance than the other sugars referred to. It may be given, consequently, in larger amounts and thus serves a better purpose as a food in supplying a greater amount of energy and of heat-producing material.

Cane sugar, on account of its sweetness and difficulty of digestion, can be taken ordinarily in but half the amount that milk sugar may be taken. I use cane sugar only under conditions in which the expense of milk sugar is a burden. The vomiting and regurgitation often attributed to fat incapacity will be found dependent on sugar excess. Repeatedly in these cases I have been able to maintain a reasonably high fat through withdrawal of a portion of the sugar. In other words, fat or sugar may produce this regurgitation, but sugar is the more prominent agent. In vomiting children, sugar should be reduced as the first step in the treatment, for the reason that fat is the more valuable nutritional factor of the two, supplying twice the number of calories. Both the sugar capacity and the fat capacity may be considerably increased by the use of considerable quantities of lime water.

The claim that milk sugar may produce alimentary glycosuria in infants is not without foundation, for I have experimentally produced glycosuria, using milk sugar in excess, giving it in 10 to 12 per cent. solutions. In the amount that it is usually employed, 4 or 5 per cent., it is unusual to find a sugar reaction in the urine under otherwise normal conditions.

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* Read at the New York Academy of Medicine, Section on Pediatrics, November 14, 1907.

Maltose incapacity is evidenced by regurgitation and vomiting and through its laxative properties. A useful field for this form of sugar is to supply carbohydrate to the constipated bottle-fed.

The systemic manifestations of sugar incapacity in infants are few. Irritability, scalding urine and eczema are the most frequent signs of intolerance or excess.

Starch.—Some infants have a low fat capacity, some a low sugar capacity, some a low proteid capacity, and others a low starch capacity. There is no age limit for cooked starch feeding. That the youngest infant can digest starch was proven in the New York Infant Asylum observations a few years ago which were made under my directions and which have been published. Moro proved a diastatic enzyme in the pancreas of an infant dying at birth and in others of tender age. Our Dr. Craig proved it in the pancreas of an athreptic infant six weeks of age. The Infant Asylum work referred to covers 677 stool examinations in 87 children under one year of age. Among 60 cases in which these examinations were carried out at length, 41 showed a good starch digestion and 19 an indifferent or poor starch digestion. Among those showing a good starch capacity 11 were under six months of age. Starch indigestion is supposed to manifest itself through a distention of the abdomen by reason of fermentation of starch in the intestine. This may take place, but it is a very inaccurate sign. In some of our cases, which showed little or no starch digestion, there was no tympanites, the starch passing through without causing the slightest disturbance. The granular appearance of the stool in the starch-fed child has been cited as proof that digestion did not take place. It shows nothing of the kind. The stools of starch-fed children present practically the same gross appearance whether they contain free starch or not. The examination of the stool by the iodin test is the only means of determining what has happened to the starch ingested.

Our observation was that if starch was not digested it did little harm. The removal of the starch from the food in children with distended abdomens produces but little or no effect on the tympanites in most cases, the distention being due to other causes. The chief harm which we found arising from starch feeding was the constipation which sometimes followed its use. This may be prevented by the use of some dextrinizing agent to convert the starch into the laxative maltose. It is rarely wise to use it in stronger mixtures than 3 per cent. in children under one year of age. In older children, as in infants, starch incapacity or starch excess is not infrequently the cause of constipation, the constipation perhaps being the only manifestation of the starch indigestion. Occasionally there will be colic and abdominal distention at this age, but this is rare.

These cases of starch constipation in older children, I have successfully relieved through reducing the amount of starch taken, removing bread, dry or toasted, crackers, zwieback and biscuits of different forms from the diet and using takadiastase in a 2½ grain tablet one-half hour after meals. By relief I mean that the constipation has ceased.

Cane-Sugar Incapacity in Older Children.—The cane-sugar capacity of older children varies greatly. Some will take from 4 to 8 ounces a day without inconvenience. In others a few grains will produce marked disturbance. The so-called lithemic children, the children with what Rachford calls the incompetent liver, are all sugar susceptibles.

The most sensitive case under my care is a boy six years of age who suffered from persistent urticaria and eczema, all of which was relieved by removing sugar absolutely from the diet. A Huyler's chocolate cream will produce a few wheals; two or three pieces an extensive outbreak.

The most usual manifestation of sugar poisoning is a persistent hyperemia of the mucous membrane of the upper respiratory tract.

Recurrent rhinitis, tonsillitis and bronchitis are seen most frequently in sugar susceptibles. Children who have eczema, frequent urticaria, rheumatism and recurrent vomiting, have a very poor sugar capacity.

In our observations relating to sugar feeding we have learned that the administration of sugar is unnecessary to the organism. Children who may have been deprived of it, for any of the above reasons, have improved in blood condition and gained in weight in a great many cases, proving free sugar unnecessary. The organism is able to convert all the sugar it needs from the starch taken in the average mixed diet. Two boys, aged nine and fourteen years, who have been under my care, one from eleven years and the other since birth, have had persistent glycosuria for six years, ranging from 3 per cent. to 7 per cent. During this time they have not received a particle of sugar, only starch as it is found in gluten bread and vegetables. In spite of this, these boys are strong and robust and large for their age.

There is not the slightest doubt in my mind but that the consuming of large quantities of sugar by the growing portion of our population is one of the great dietetic errors of our day.

(The discussion of this paper will be found on page 223.)

CYSTITIS IN NURSLINGS.—Giuseppe Caccia (*Rivista di Clinica Pediatrica*) considers that cystitis is comparatively frequent in nurslings. but is not usually recognized, being confounded with the effects of disturbances of digestion or other childish troubles. Its causes are various and include the same factors that produce it in adults—catheterism, infective diseases, etc. It results from fever, profuse diarrhea, cold, uricemia, arthritic diathesis, poisons, urinary stasis, and tuberculosis; from the gonococcus rarely, and from other bacterial agencies. There is one form that especially interests the author—that resulting from the presence of *Bacillus coli* in the urine. In female children these germs may be introduced from the vagina; in males when phimosis exists. In this case the infection is ascending. It is not probable that it often is of hematogenous origin and the author discards the theory of passage through the intestinal walls. The author has observed the disturbance in 15 cases—6 males and 9 females. In all the males there was phimosis, and this is regarded as an important factor. The symptoms are fever, pain, nocturnal enuresis in cases in which the pain causes the urine to be withheld during the day, turbid, acid urine, containing agglutinated leukocytes and bacteria, odorless, and with small amount of albumin. The disease when not treated generally is cured spontaneously after a time, so that the prognosis is good.—*Boston Medical and Surgical Journal.*

Hospital Clinic.

THE BABIES' HOSPITAL, NEW YORK.

SERVICE OF L. EMMETT HOLT, M.D.

TWO CASES OF ACUTE MENINGITIS OF THE CONVEXITY.

BY JOSEPHINE HEMENWAY, M.D.,
Resident Physician.

CASE I.—ACUTE MENINGITIS DUE TO THE PNEUMOCOCCUS; DEATH; AUTOPSY.

Female, aged twenty months; admitted August 17, 1906. Father, mother and two other children were healthy. One child died with cerebrospinal meningitis six years ago.

The child had been perfectly healthy until this present illness, though always delicate, and had never walked. She could say a few words, and was considered a bright child. Until four o'clock of the day of admission she had been well and playful. At that hour she was seized with a general convulsion, followed the same day by five others. Admitted to the hospital at 9 P.M.

On examination there was found a poorly-nourished child, quite unconscious. The fontanel was small and just even with the skull. The eyes were staring, with widely dilated pupils; there was internal strabismus and slight lateral nystagmus. The temperature was 100° F.; pulse and respiration were regular. The lungs, heart and abdomen were normal. The knee-jerks were exaggerated. No opisthotonus or rigidity of extremities was present. Kernig's sign was absent. Slight convulsive movements of the fingers occurred at short intervals. There was a leukocytosis of 24,200.

One hour after admission a severe general convulsion occurred. By lumbar puncture only 5 c.c. of clear fluid under less than normal tension could be obtained. Very careful search was made for tubercle bacilli, but none could be found. No meningococci or other organisms were found on smears or by cultures.

The case seemed clearly one of meningitis, and as the meningococcus could not be found and the character of the cerebrospinal fluid pointed against it, the case was regarded as a probable tuberculous meningitis.

The stools during the next few days were thin, frequent, containing mucus and small flecks of blood. Vomiting occurred about once a day. This intestinal condition continued for nearly two weeks.

For six days after admission the nervous symptoms did not change materially. There was coma, twitchings, strabismus, nystagmus and a general relaxation rather than rigidity. The pulse and the respiration continued regular. The temperature curve is shown in the chart. (Case I.) A second lumbar puncture was made on the seventh day and 30 c.c. of clear fluid obtained. This was examined as before, both in smears and cultures, but with negative results; no organisms of any variety could be detected.

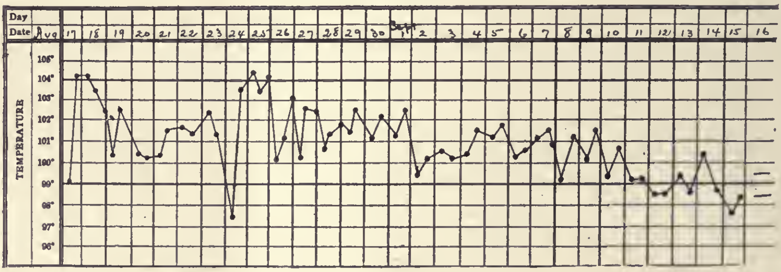

CHART OF CASE I.

During the second week the child became gradually somewhat brighter, and, at intervals, partly conscious. There was, now, hyperesthesia and general irritability, but otherwise no change in the nervous symptoms. Apparently, she could neither see nor hear. Ophthalmoscopic examination by Dr. W. B. Marple showed both discs normal. About the eighth day there was an otitis media of the right side and paracentesis was done.

From this time until the fourteenth day the condition resembled that of a child in active delirium. She made no movement unless touched, but then she would start violently, rolling the head from side to side, and making wild, irregular movements of all the extremities. There was also an unintelligible chattering and grinding of the teeth until she was left undisturbed.

During the third week bronchopneumonia developed with consolidation in the left interscapular region. The lungs were clear after seven days. Then there followed a return of the nervous symptoms above described. She lost weight steadily until the emaciation became marked.

A third lumbar puncture was made in the fifth week, at which was withdrawn 105 c.c. of clear fluid under increased tension. This fluid, like that obtained by previous punctures, was found negative after careful examination.

By the end of the sixth week most of the acute symptoms had subsided and the child resembled one with defective cerebral development and inanition. From this time until about two weeks before death there was little change, except progressive wasting.

General tuberculosis was suspected and many examinations of the sputum were made with negative results. Signs in the lungs again developed, but on the opposite side to that first affected, and persisted until death. Fluid was suspected and a needle inserted several times, but no fluid was obtained.

The child died of exhaustion on the seventy-third day of her illness, there having been no active nervous symptoms for several weeks.

Autopsy.—Brain.—No excess of cerebrospinal fluid; no marked congestion or edema; no ventricular distention.

Meninges.—A marked lesion limited in extent to the parietal and frontal lobes, superior and lateral aspects, as far back as the fissure of Rolando. Here the pia was thickened and cloudy and infiltrated with fibrin and pus in sufficient amount to give the brain in this affected region a yellow appearance. The lesion was more marked on left side than on right. The appearance of the brain in this affected region a yellow appearance. The lesion was the convexity and the base, both of which were quite normal. The brain substance was normal on section. The spinal cord was removed and examined throughout. The meninges were everywhere normal as was also the cord itself.

Lungs.—Bronchopneumonia was present with consolidation of the left lower lobe and a small sacculated empyema, containing about one-half ounce of pus. The other organs showed nothing abnormal.

Bacteriological Examination.—Smears and cultures were made from the exudate of the meninges and the lung, both of which showed the pneumococcus lanceolatus of Fraenkel, pure.

CASE II.—MENINGITIS OF THE CONVEXITY; RECOVERY; ETIOLOGY UNKNOWN.

Female, aged seventeen months, colored. The patient was an only child.

There was no history of tuberculosis, near or remote, in the family. Up to the time of the present illness the child had been bright, playful, and was beginning to say a few words. She could sit alone, and was considered a normal infant. The general health had been excellent up to the present illness.

Two weeks before admission there was observed a change in the disposition of the child. She became irritable, crying constantly, was wakeful and appeared quite ill. There seemed to be fever, but the temperature was not taken. No physician was called to the case. These symptoms continued during the entire two weeks, when there occurred two general convulsions, after which the previous symptoms of fever and great restlessness recurred.

There had been no gastrointestinal symptoms, and no stupor until after the last convulsion, when it slowly developed. After an interval of three days there were two more convulsions. The child was taken to a dispensary, from which she was referred to the hospital.

The child was admitted to the hospital on November 20, 1906. Examination showed a well-developed, slightly rachitic child. The temperature was 104° F.; pulse 120 and regular. The respirations were slow, but regular. The child was unconscious. There was no opisthotonus, no rigidity of extremities, no increased reflexes, no Kernig's sign. The fontanel was slightly depressed. Physical examination of the chest and abdominal organs revealed nothing abnormal.

On the following day this condition of stupor changed to one of marked irritability with convulsions. The convulsions previous to this had been described as general. At this time the twitching of the right side of the face and the right arm was especially marked. These movements lasted during the entire day.

The pupils were equal, moderately dilated, and lateral nystagmus of both eyes was present. The temperature was irregular, varying from 100° F. to 105° F. The case was regarded as a meningitis, and on account of the gradual onset, the late convulsions, marked stupor and lack of hyperesthesia, most probably a tuberculous meningitis.

A lumbar puncture was made and 120 c.c. (4 ounces) of clear fluid obtained under increased tension. Cultures from the fluid were negative and no organisms of any kind could be found in the smears after prolonged search.

For four days these active nervous symptoms continued, the temperature remaining high. Two leukocyte counts were made; the first being 12,000 and the second 10,000.

At a second lumbar puncture only 5 c.c. of clear fluid was obtained, the fluid coming slowly, drop by drop. This was also carefully examined, but no organisms found.

For the next week there was marked stupor with almost complete muscular relaxation. All food was given by gavage. The child looked desperately sick and there was practically no hope of her recovery. The temperature rose to 105° F. (See chart, Case 2.)

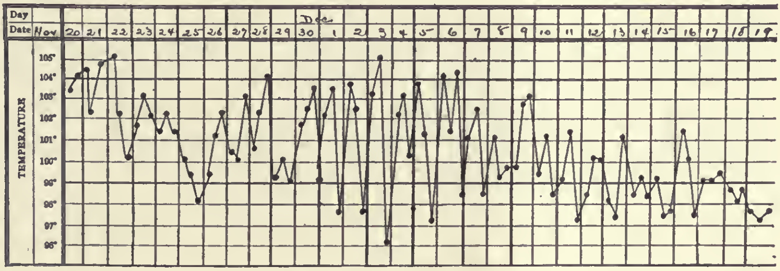

CHART OF CASE II.

At a third lumbar puncture 45 c.c. of fluid was obtained. This was also clear and negative on examination. The fluid showed definite reduction with Fehling's solution.

Both eyes were found to be normal on ophthalmoscopic examination.

Two weeks after admission pneumonia developed with a small area of consolidation in the left interscapular region. Signs in the lungs continued for about one week.

The diagnosis was still obscure. Cerebrospinal meningitis was not considered on account of the negative lumbar punctures so early in the disease. General tuberculosis appeared probable, and, on account of the area of consolidation in the lungs, repeated examinations of the sputum were made for tubercle bacilli, but none were found. This case so closely resembled that reported as

No. I. that a convexity meningitis was thought of very early in the illness, and, considering the condition of the child at the time, this seemed by far the most probable diagnosis. The fact that pneumococci were not found in the cerebrospinal fluid would not alter the diagnosis, as the fluid was sterile in Case I., in which the diagnosis was confirmed at autopsy.

In this patient the fever continued for twenty-three days after admission. With the subsidence of the temperature the nervous symptoms gradually diminished and improvement in the general condition became marked.

Discharged from the hospital after a stay of three months, on February 7, 1907. At that time the child was well nourished, weight 21 pounds, 7 ounces, and gaining on the average one pound a week. The child could not sit alone nor hold the head erect. By repeated tests it could not be determined that she could either see or hear. Food was recognized only when the spoon touched the lips, but then was taken eagerly. Sensation for pain and touch was present over the entire body. There was no opisthotonus or rigidity of extremities. The mental condition had not improved since the height of the illness.

For the next two or three months the child was seen at intervals by a visiting nurse from the hospital, but no special change in the symptoms was observed.

August 18, 1907, about six months after discharge, the patient was brought back for examination. In general condition, striking improvement was noted—a gain of seven pounds in weight, four inches in body length and one-half inch in circumference of the head. She had gained also greatly in muscular power and control; could hold up the head, and even sit alone, but made no effort to creep, and was not able to stand even with assistance. The upper extremities were used freely. She would reach for and handle toys freely, but could not feed herself. There were no rhythmic or athetoid movements, although there were aimless movements of both hands and feet at times. Reflexes were normal; no rigidity. Both sight and hearing were present; whether normally acute it was impossible to determine. She could say "Mamma," but no other distinct words. She remembered many things and knew her mother. By the parents the child was regarded as quite recovered except in her backwardness in walking. It was, however, evident to anyone closely observing the child that she was mentally defective. She smiled when approached, but responded very imperfectly to most external impressions.

Remarks by Dr. L. Emmett Holt.—Although the child whose history is first narrated was under observation for practically the entire ten weeks of the illness a positive diagnosis was not made during life. It may be of some interest to record the various opinions held at different periods in the course of this long illness. The onset was fairly typical of cerebrospinal meningitis, and that diagnosis was unhesitatingly made until repeated lumbar punctures were made with negative results. This was regarded as settling the question definitely. The prominence of the intestinal symptoms during the second and third weeks seemed against any form of acute meningitis, and, in fact, at one time led to the opinion that the case was one of acute enterocolitis beginning with marked nervous symptoms. But the persistence of the latter after the bowels were quite normal was difficult to explain by any other theory than that some lesion of the nervous system existed. The continued wasting and the development of definite pulmonary signs led to the suspicion of general tuberculosis with possibly a tuberculous lesion in the brain. But careful and repeated examination of the sputum for bacilli gave negative results, nor could bacilli be found in fluid drawn by lumbar puncture.

For the last month the child presented the general symptoms of extreme malnutrition coupled with a nervous condition very like that seen in infants who are mentally defective. It seemed possible that the nervous symptoms could be functional and be the result of the disturbance of nutrition. Toward the last we were led to doubt the correctness of the mother's statement that previous to the illness the child was bright and normal in all respects. The pulmonary signs which developed during the last week were regarded as due to terminal pneumonia.

The clinical conditions were made quite clear by the postmortem findings. The cerebral lesions were those of typical meningitis, but peculiar in being limited to the convexity. Had a microscopical examination of the cortex been made a certain amount of encephalitis would pretty certainly have been found.

While there was lacking in Case II. an autopsy to confirm the diagnosis, the clinical course was so like that in Case I. that it seemed clearly the same disease. In Case I. recovery would undoubtedly have occurred but for the severity of the pulmonary lesion which accompanied the meningitis. In Case II. the pulmonary disease was much less severe and lasted but a brief period; and again this patient was in excellent health previous to the attack, while the other child had always been delicate.

From the histories of these 2 cases and others observed at the Hospital the following conclusions have been reached:—

(1) Acute meningitis of the convexity is usually due to the pneumococcus; and, furthermore, in all cases of pneumococcus meningitis the lesions at the convexity are usually the most marked.

(2) This occurs apparently as a primary disease and also as a sequel to pneumococcus lesions elsewhere in the body—generally pneumonia.

(3) When the lesion is confined to the convexity many of the nervous symptoms commonly associated with acute meningitis, but which are due to basal lesions, are wanting, *e.g.,* cervical opisthotonus, bulging of the fontanel and the characteristic disturbance of pulse and respiration. The rigidity, hyperesthesia and increased reflexes of acute cerebrospinal meningitis may also be absent.

(4) Lumbar puncture may give negative results whether made either early or late in the disease.

(5) The nervous symptoms present are usually of a general character—convulsions, irritability, nystagmus, delirium, stupor, etc.—followed, if the case survives the acute stage, by symptoms largely mental and which are difficult to recognize in young infants.

INFLUENZA AMONG CHILDREN.—Jehle (*Jahrb. f. Kinderh.,* Vol. XLVII.) describes an endemic induced by the *Micrococcus catarrhalis* in the infants' ward in a hospital. The infants in the incubators were not affected, but the other children had several recurrences of the epidemic febrile affection. High fever was the only marked symptom and no complications were observed, not even coryza, except in a few instances. Five drops of pyocyanase were instilled into each nostril, and infants thus treated were spared further recurrence, while the bacteriologic findings were constantly negative thereafter.—*Journal of American Medical Association.*

Clinical Memorandum.

THREE INTERESTING CASES IN CHILDREN OCCURRING IN A GENERAL PRACTICE.

BY JOSEPHINE MILLIGAN, A.M., M.D.,
Jacksonville, Ill.

I.—TYPHOID FEVER IN AN INFANT OF EIGHTEEN MONTHS.

In October, 1904, A. A., Jr., aged eighteen months, ran a continued fever with a daily rise to 101° F. to 103.5° F. Just before death convulsions supervened and the temperature rose to 106° F. When the fever was at its height there was some stupor and retraction of the head. The diagnosis lay between tuberculous meningitis and typhoid fever. Death came on the eighteenth day. Cultures from the spleen, spinal fluid, urine and the mucous surface of the small intestine were made by Dr. Grace Dewey. Typhoid bacilli were found in the cultures from the spleen. No tubercle bacilli were found.

The child had been brought from Michigan to Central Illinois shortly before the illness, and had been fed on the way with milk that varied in cost from five to fifteen cents a quart. The milk was probably the source of the infection. In view of this, it would seem a safer plan to feed children on malted or condensed milk prepared with boiled water when there is necessity for travel.

II.—A CASE OF GASTROINTESTINAL HEMORRHAGE IN THE NEWLY-BORN.

Baby G. was born August 19, 1905, at the Passavant Hospital. His parents were healthy and free from constitutional disease. There was no history of hemophilia. The labor was normal. The baby was an average-sized, well-nourished boy of good color. He passed urine and meconium freely shortly after birth. When nineteen hours old he vomited at least half an ounce of bright blood with considerable projectile force. He became slightly cyanotic and his extremities were cold.

During the following twelve hours, there was some choking and spitting up of tiny clots of bright blood and then some brownish material, probably changed blood. Within a short time, however, even the brownish material disappeared.

For the next four days there were frequent and copious movements, some showing bright blood and some looking like meconium, but containing blood, as evidenced by the abundant hemin crystals demonstrated by microscopical examination. These were found until after the fourth day.

The temperature rose to as high as 102° F. The feeble condition of the child continued only for a few days, and, with the exception of a slight jaundice, he made a complete recovery.

The treatment consisted, first, of rest. He was not lifted from his basket for five days. The feeding consisted of hot water, then modified milk until the mother's milk came in, when that was fed to him from a bottle. On the fifth day he was put to the breast. He had one oil bath daily and received 1 grain of subgallate of bismuth every three hours.

Subsequently the patient was vaccinated and revaccinated without any signs of hemophilia, and has grown up into a sturdy, active boy.

III.—A CASE OF CONGENITAL TALIPES VALGUS CURED BY MASSAGE.

August 17, 1903, Mary S. was born normal in all respects except that the left foot had a marked talipes valgus. The peronei muscles were strongly contracted and the tendo Achillis more tense than normal, so that the foot was everted and the heel raised. It was impossible to press the foot into position because of the contractures. Passive motion and massage were given for twenty minutes, night and morning. The child was seen infrequently, but steady progress was reported. At one year she was ready to walk and at that time it was necessary to refer to the history to determine which foot had been deformed. At three years of age she presents a perfectly normal appearance.

BUTTERMILK FEVER.—Romme (*La Presse Médicale,* February 13, 1907) reviews the cases reported by Tugendreich and Rivet in which a fever was induced in children by the drinking of buttermilk. In Tugendreich's cases the fever seemed to be an expression of an idiosyncrasy against buttermilk, while in Rivet's cases an acute gastroenteritis appeared to have been induced.—*New York Medical Journal.*

ARCHIVES OF PEDIATRICS.

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GOAT'S MILK FOR INFANT FEEDING.

For generations goat's milk has been utilized by various peoples in different parts of the globe for the artificial nourishment of infants. It has been used in conjunction with, and as a substitute for, breast milk, particularly by the Italians, the French and the Spanish, both in their own countries and in their colonies. Some time since, Hubert, writing in the *Roussky Vratch,* gave it as a result of his long experience in the artificial feeding of infants that goat's milk is a very valuable adjunct for the nutrition of infants, especially in connection with municipal infants' milk depots. He is convinced, from his experience in St. Petersburg, that goats serve as a fair substitute for wet-nurses, whom it is almost impossible to secure in sufficient numbers. In an article discussing fat indigestion in ARCHIVES OF PEDIATRICS, in March, 1906, Dr. J. Finley Bell suggests that one of the reasons that goat's milk is less apt than cow's milk to disagree with infants is that the melting point of fat is lower in goat's milk than in cow's milk, and he urges the advantages of an available supply of goat's milk for infant feeding.

Everyone who has been confronted by difficult feeding cases must have wished at times that it were possible to obtain goat's milk in this country as readily as in France and Italy. In the Italian quarters of New York, goat's milk can be purchased for infant feeding and is regularly used by several of the Italian physicians; but in most places it is impossible to obtain it. Authorities agree that goat's milk is more easily adapted to the infant's digestion than is cow's milk. Again, if the theory is correct that the strength of the digestive secretions depends in large part upon the character of the food ingested, and that the mammalian milk is adapted to develop in each species the type of digestion needed, we should feel, in view of the goat's notoriously vigorous powers of assimilation, that this milk, which serves to develop and educate such hardy organs in the young goat, should be of value in calling forth the strongest powers there are in the human infant's digestive capacity, provided always that the food made from goat's milk is carefully modified so as to prevent initial digestive disturbances.

Finally, since immunity to disease, according to many authorities, may be transmitted by milk, and since the goat is immune to tuberculosis and is an exceptionally hardy animal, this milk might be of service in furnishing some protective substance against tuberculosis and other diseases the goat resists.

The animals to be chosen for this purpose are preferably the Alpine goat or the Nubian goat. These are hardy, teachable and without disagreeable odor. Moreover, their milk is free from any offensive taste. The cost of keeping goats in enclosures and cleanly stables and the cost of their care is much less proportionally than that of keeping cows. Moreover, the goats can be kept near the city or in the town—even in one's back yard—so that the milk can be obtained fresh and transportation charges are negligible. Of course, all the approved dairy rules should be observed for goats, as in the case of cows, whose milk is to be used for infant feeding.

Modifications of goat's milk may be made in the same way as when cow's milk is used. The goat's milk has a larger proportion of fat, a lower proportion of sugar and a higher proportion of proteids than has cow's milk. The percentages average about 4.8 per cent. fat, 2 to 5 per cent. sugar and 5 per cent. proteid, of which 1.2 per cent. is lactalbumin. Since the fats and the proteids are each about 5 per cent., it is evident that at the outset goat's milk should be diluted somewhat more than cow's milk. Also it is evident that the amount of sugar to be added should be greater than with cow's milk. On the other hand, on account of the larger proportion of low melting fat, and on account of the larger proportion of lactalbumin in the proteids, the dilution can be lessened and stronger mixtures given earlier than with cow's milk. Experience shows that there is less apt to be vomiting or intestinal indigestion than when cow's milk is used in the same proportions. Moreover, the stools tend to have the color and odor of those obtained from breast-milk feeding.

It is hoped that with increasing knowledge and use the demand for goat's milk will grow sufficiently to make it profitable for some enterprising dairyman in every large city to make a specialty of furnishing goat's milk for infant feeding. Some of the dairies which now supply certified milk for infants might well add a small herd of goats to their equipment, so as to provide goat's milk to those of their clientele who desire it.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, November 14, 1907.

Godfrey R. Pisek, M.D., Chairman.

A CASE OF THYROID IMPLANTATION IN A CHILD.

Dr. Louis Fischer presented this case. The patient was first seen by him December 8, 1902, when she was two years old. She could neither walk nor talk. The tongue was very thick and protruding. The lips, eyelids and the skin of the face were thickened, coarse, and rough. The nose was short and flat. The skin had a jaundiced appearance. The fontanel was widely open anteriorly and posteriorly. The face was broad and the eyes set far apart. There was a marked depression on each side of the temporal bone, as well as a frontal protuberance. The body was well developed and fat. There were no evidences of rickets. The internal secretions were very torpid. Constipation was obstinate. She had great fear of water. The hair was thick. The thyroid gland could not be felt. The pulse was 90 and the temperature was subnormal. The respirations were 16 when she was quiet and 24 when crying. The urine was normal. One grain of thyroid was given three times a day; the dose was rapidly increased so that, after the first week, the child took 2½ grains three times a day. This treatment, together with attention to diet, hygiene, etc., was continued and the child developed rapidly. The bowels became regular, and the teeth appeared at regular intervals, the first at sixteen months, one month after the treatment was instituted. The growth in one month amounted to three and one-eighth inches. At the end of one year she had grown thirteen and one-half inches. In 1907, however, her mental condition was about equal to that of a child eighteen months or two years old. She was taken to Mt. Sinai Hospital, where Dr. Lilienthal operated on her, May 8, 1907, transplanting some pieces of sheep thyroid into the connective tissue of the abdomen. She remained in the hospital about two months. Normal conditions prevailed during the first month after the operation, and she did not appear to suffer from the stopping of the thyroid feedings. She was now taking 5 grains of thyroid three times a day. Her condition had greatly improved. She played and sang and was far more intelligent than before the operation. Implantation of thyroid grafts from animals by using sheep's thyroid had been done by Sir Victor Horsley. An entire lobe, or part of the gland, was removed and buried in the connective tissue. Human thyroids were used in 1883 by Kocher and others, but the combined results were no better with the homothyroids than those with the heterothyroids.

REPORT OF A CASE OF CONGENITAL GOITER IN A CHILD, WITH OPERATION.

DR. EDWARD WADSWORTH PETERSON reported the case of a child, who was five weeks old, of healthy parents and with no history of syphilis, tuberculosis, cancer or goiter in the family. The mother had had one miscarriage at the second month. This patient was her first child, and the labor was uneventful. The child appeared normal except for a swelling on the right side of the neck. There was some difficulty in breathing for the first two hours after birth, but this soon subsided. Apparently the tumor caused her no inconvenience whatever. An examination showed an enlargement on the right side of the neck, anterior to the sternomastoid muscle, just below the lobe of the ear, filling the submaxillary space, and extending downward nearly to the clavicle. It was smooth, moderately firm in consistence, and did not fluctuate at any point. Below and on the sides there were palpable distinct nodulations. At operation the tumor was dissected out without difficulty. Several times during the operation the infant ceased to breathe, and for twelve hours after the operation it was occasionally necessary to resort to artificial respiration. Except for high temperature following the operation, there were no special features until the ninth day, when the child had a convulsion lasting five minutes. On the thirteenth day there were twitchings of the extremities, and the eyes rolled from side to side. On the fourteenth day there were almost constant convulsive movements of the hands, arms and legs, with twitching of the facial muscles, and rolling of the eyes. The pathologist reported the tumor to be a congenital goiter. The interesting features in this case were the presence of a congenital tumor which proved to be a goiter; the abnormal location of the thyroid; the accidental thyroidectomy; the development of tetany on the ninth day which continued until thyroid extract was administered.

Dr. Herman Schwarz asked if the child was getting thyroid yet, and also whether the tumor was examined to see if the parathyroids were there.

Dr. Peterson replied that the child was taking thyroid at the present time. In removing the tumor the capsule was split and the gland proper was enucleated. The parathyroids were not removed. He did not know how to explain the tetany, a condition which only developed after the parathyroids had been removed. He hoped to show the case at some future meeting of the Section.

PROTEID INCAPACITY IN INFANTS AND CHILDREN.

Dr. Henry Dwight Chapin read this paper. He said that a number of forms of proteid were successfully used in infant feeding, and no pediatrist confined himself to any one form. It could not now be said that proteid incapacity existed merely because the infant did not tolerate whole milk or diluted cow's milk. Often when the character of the proteids was changed, infants not doing well had begun to thrive. These infants really had incapacity for certain *forms* of proteid, but showed great capacity for other forms. Infants could not thrive without proteids, and if they had real proteid incapacity they would soon die of inanition. The use of the term proteid incapacity should be restricted to those cases where no form of proteid was long tolerated, and the term proteid *idiosyncrasy* applied to those in which one form was tolerated when another was not. The cases of proteid incapacity which were treated successfully were usually those of proteid idiosyncrasy, caused possibly by impaired digestive organs, or by conditions not understood, but which undeniably existed. It should always be borne in mind that proteid is not a simple substance, as fat or carbohydrate, but a series of highly complex bodies differing in form, taste, composition and nutritive value. It was possible that many of the poor results in infant feeding were due to the exclusive use of proteid deficient in iron and phosphorus. In conclusion it might be said that the class of cases which actually showed real proteid incapacity was made up of those who were permanently physically unfitted, and those who might be only temporarily unfitted, through digestive disturbances, for digesting proteids. Those in the first class would die. Many in the second class could be saved by mother's milk only, or by the use of very light diet that remained fluid in the stomach. In some of these cases the use of vegetable proteid with milk proteid, especially vegetable proteid rich in iron (oat and legumen), which he had termed mixed proteid feeding, might cause a general upbuilding, and improved digestion would follow. Whenever there was difficulty with proteid in a fairly well nourished child, mixed proteid feeding, using high proteid gruels with the milk, should be tried, for there might be only proteid idiosyncrasy present.

CARBOHYDRATE INCAPACITY IN INFANTS AND CHILDREN.

DR. CHARLES GILMORE KERLEY read this paper. (See page 203.)

FAT INCAPACITY IN INFANTS AND CHILDREN.

DR. JOHN HOWLAND said that in recent years a decided change in opinion in regard to the injurious effects of fat had come about. That previously it had been generally considered as capable of producing very little disturbance, whereas now, by many, it was regarded as the most frequent disturbing element. At first it was by clinical observation that the deleterious effect of fat had been discovered, but the more recent chemical work of the Breslau school had shown the harm that an excess of fat was capable of causing.

He thought that the capacity of children for fat could not be expressed in percentages. The limit was a variable one, differing with each individual child; but the capacity which normal healthy infants possessed was not shared by the premature and feeble, was seriously impaired during any illness, especially a febrile one, and was almost entirely suspended during and for a long time after an acute inflammation of the gastrointestinal tract. Fat incapacity was very commonly developed under artificial feeding, much less often under breast-feeding, might show itself suddenly even when the offending diet had been apparently well borne for weeks or even months, and when once developed it had a marked tendency to persist.

He said that the symptoms due to an excess of fat might be roughly divided into gastric, intestinal and constitutional, though these were usually more or less associated. Much light had been thrown on the causation of the symptoms in the gastric cases by the observations of Chigin, working in Pavlow's laboratory. He had shown that fats of all kinds, including cream, caused no excitation to the flow of gastric juice, and when mixed with proteid food they had a direct inhibitory effect upon the secretion of gastric juice. Lintareu, moreover, had shown that under certain circumstances the presence of a large amount of fat caused an increased retention of the stomach contents.

The intestinal symptoms were many. In the mildest instances the stools contained larger or smaller white masses called "curds," and erroneously supposed to be lumps of casein. These could be proved chemically to be in the great majority of instances soaps of the fatty acids. In more marked instances constipation was the rule and was most characteristic. The stools were then usually large, dry, light-grey or white in color, foul in odor and alkaline in reaction. They were almost entirely made up of the insoluble soaps of the fatty acids. The apparent lack of bile had been explained by Langstein, who had recently demonstrated that the white stools were not acholic, but that owing to the alkaline reaction the bilirubin instead of being transformed into urobilin was changed to a colorless urobilinogen. The foulness resulted from the increased putrefaction allowed in the alkaline medium and from the delayed stay of the fecal mass, for with such stools children were very constipated. The saponification of the excess of fatty acids demanded alkalies, and these were lost to the organism, a fact of the greatest importance. Steinitz had been able to show with great exactness that a diet rich in fat (4 to 6 per cent.) caused regularly a loss of alkali by the intestines, and that the alkali excreted was greater than that ingested in the food.

In children fed upon a diet excessively rich in fat there were occasionally met with constitutional symptoms of a most stormy character. There might be, with or without evidences of much gastrointestinal irritation, high fever with its concomitant symptoms. Associated with the fever, which might rise to 105° F. or more, prolonged and persistent convulsions occasionally occurred, followed by marked nervous symptoms, such as laryngismus stridulus and tetany. Many typical examples might be found in the literature. While these symptoms were decidedly exceptional, there were others that were usually apparent, such as pallor, languor, malaise and a marked loss in muscular tone though the child might be exceptionally fat. If heed were not given to these danger signals loss of weight might begin and increase progressively so that a condition of extreme malnutrition might result.

The valuable studies of Keller and Steinitz had assisted materially in demonstrating how such results were brought about.

Keller had first shown with great exactness that an increase in the fat of the food beyond certain limits caused a great increase in the ammonia nitrogen of the urine. Steinitz, in pursuing these investigations further, had proved that an excessive loss of alkali by the intestine followed the ingestion of an excess of cream. The alkalies of the body were called on to furnish material with which to saponify the excess of fatty acids set free in the intestinal tract. There were not enough fixed alkalies for this purpose and to neutralize the acids formed in metabolism and eliminated by the kidney. To accomplish this latter purpose other bases had to be supplied, and the most readily-furnished one was ammonia. In this way arose the excessive excretion of urinary ammonia, and the condition was therefore a relative acidosis. The ammonia thus furnished, if for more than a short time, came from proteid circulating in the fluids of the body or already built up into an integral part of the organism. The effect was, therefore, the same as if the condition were an actual acid intoxication, a condition interfering with the most important functions of the body. If this were the only result it was still sufficient to prove the danger from an excess of fat.

Dr. John Lovett Morse, of Boston, Mass., said that he came to be instructed and not to talk. Dr. Howland's paper he considered to be an admirable one, but he feared that it might give a wrong impression to those who were not familiar with infant feeding. Everyone who had had experience in infant feeding knew that too much fat caused these symptoms. On the other hand, they knew that a normal breast-fed baby got 4 per cent. fat in its food. They also knew that they had fed babies for years on modified mixtures containing from 3 to 4 per cent. of fat, and that the vast majority of these babies had done well on these percentages. Those who did not do well were the ones who were getting 6, 8, 10 and even 12 per cent. of fat in their food. It is not the ordinary and proper amount of fat that does harm, but the excessively large amounts of fat which are often given.

He mentioned one clinical fact in connection with the symptoms of fat indigestion in babies: that when there is ammonia in the urine it is diminished by a diminution in the amount of fat in the food.

Dr. Rowland G. Freeman said that in infant feeding the element in the milk that most often gave trouble was the proteid. In spite of the fact that curds in the milk were found to consist of fats, soaps and the fatty acids, he believed they were evidence of defective proteid digestion, because if one made the proteids more digestible the curds diminished. Peptonizing, or the addition of cereal diluents, often caused the curds to disappear.

Since Dr. Chapin had referred to one class of cases with deficient proteid digestion that would die, he thought it well to emphasize the fact that this was a very small class. Almost all babies, when properly fed, and given proteid in digestible form, would thrive. The babies that died, as a rule, were hospital babies. It was a very rare thing for a baby in private practice with deficient proteid digestion to succumb to this trouble. When the proteid was not well digested, cereal decoctions, whey mixtures, or peptonized wheys were most valuable.

As to sugars, he believed it was very rare indeed for lactose in normal amounts to cause trouble. In a series of experiments made for the purpose of comparing the results of feeding cane sugar and sugar of milk, taking two groups of cases, it was found that a large proportion of children did as well on cane sugar as on sugar of milk, but a certain number did well only on sugar of milk.

As to the fats, in spite of Dr. Morse's warning, it should be emphasized that fat in large amounts caused disturbances. Sick babies would often thrive better if the percentage of fat was no higher than the percentage of proteid. If it was twice as high as the proteid it would usually make a better mixture than when three times as high.

Dr. E. H. Bartley, of Brooklyn, speaking of the stools, said that he had found putty-like stools were usually composed of either fatty acids or soaps, mixed with proteid material. In the alkaline stools there were ammonia soaps present, but it was hardly a correct statement to say that this was usually due to the fats. While that might be true to some extent, he said he had examined many stools and had found that while in many cases fatty acids were easily dissolved out by ether, there was also proteid in considerable quantity. Perhaps this was not a true curd, but the residue left from the digestion of casein or pseudonuclein. Many pasty stools were composed of fatty acids and proteid residue, which indicated proteid rather than fat indigestion, and strangely enough the two often go together. An alkaline reaction could only come from one of three sources: either from an excessive amount of serum in the intestines, or from the administration of an alkali, or possibly from an alkaline fermentation. It was very difficult to analyze just what did take place. The alkaline reaction of stools should be studied more. There were many stools acid in reaction with fat indigestion. It seemed to him that the reddening of the skin of the buttocks was due more to the irritation of butyric acid than to the alkali. An alkaline stool was the exception rather than the rule.

In speaking of carbohydrate incapacity, especially of the excessive use of sugar in older children—in children from two to ten years—he said he had been studying this for many years, and had tried to fathom the cause of certain symptoms, symptoms to which he himself had been subject. He could get up a headache by eating invert sugar, *i.e.*, sugar cooked with acid fruits. He could eat rock candy or crystalline sugar without producing that effect. It was the invert sugar that did it. Glucose would do it. He therefore concluded that it was the invert rather than pure cane sugar that caused the symptoms. Maltose would not do it to the same extent. Lactose did not do it in his particular case. In children, where one had sugar incapacity, the giving of the invert sugar seemed to have a worse effect than cane sugar. He had seen these results from eating candy—the ordinary candy containing from 10 to 25 per cent. of glucose. In such an instance there would be both fermentation and absorption of glucose into the circulation, going directly to the liver; therefore, the symptoms did not seem to be entirely due to the fermentation, for they appeared too soon. The effects of excessive use of sugar in children were most likely to occur either very soon after eating it, or from ten to twelve hours after.

Dr. Thomas S. Southworth said it was interesting, in listening to the papers read, to note the position the different readers took concerning the meaning of the term "incapacity." The fact should be recognized that there might be a real incapacity or an apparent incapacity; also at times an absolute incapacity or a relative incapacity. Therefore, when the question of incapacity was brought up, it must be looked at from many standpoints.

Dr. Chapin had spoken of proteid incapacity and proteid idiosyncrasy. An incapacity for casein did not imply an incapacity for other types of proteid. Dr. Dunn, of Boston, had brought out most admirably in a recent paper the fact that where casein was badly digested the casein could be reduced with the introduction of soluble proteids of whey and so successful gains could be inaugurated. It made a great difference in determining the question of incapacity, or relative incapacity, how the foods were manipulated. As one analyzed the methods of men prominent in infant feeding, one saw that they arrived at good results in different ways. There were those who by keeping the proteids low were able to run the fats up higher than perhaps seemed to some advisable. There were others who showed by their work that by keeping the fats low they could get the children to assimilate larger amounts of the muscle-making casein. Similar results could sometimes be obtained with proteids and sometimes with fats by additions of other substances to the milk mixture. The effects of such additions depended upon the chemical and physical changes which they produced, whether they were cereals, alkalies or malted preparations.

All would agree with the position taken by Dr. Kerley with regard to the excessive use of sugars.

They were indebted to Dr. Howland for placing the subject before them in such a clear manner and crystallizing the growing opinion concerning the excessive use of fats. The yellow stool was supposed to be a good stool, yet many of them were poor ones. With the further development and study of the stools he believed they would have better ideas of the difficulties of infant feeding than they now had simply from the consideration of symptoms alone.

He wished, however, to take exception to what Dr. Howland had stated in regard to curds—the so-called hard curds. These masses when examined microscopically and chemically might be found to consist largely of fatty acids and soaps. But they did not originate this way. When milk was subjected to the action of rennet and acid, fat became enclosed in the meshes of the paracasein curd and there were present both proteid and fat. As this mass passed through the intestines there occurred a great deal of proteid decomposition due to bacterial action, and some of the proteids might disappear. Hard curds originated as milk curds containing both fat and proteid.

DR. LOUIS FISCHER said that in studying the digestive capacity of a given infant, one must consider, first, were they dealing with a normal infant and a healthy stomach plus normal functions, or were they feeding a sick baby with abnormal digestive powers? There was a decided difference in the capacity or incapacity of such infants in dealing with the required percentages of fats, proteids and carbohydrates. A healthy infant might assimilate 2 per cent. or more of fat during its first month without gastric disturbance. A dyspeptic infant might show gastric disturbances with a 2 per cent. or less fat. The same rule applied to the digestion of proteids. Proteid indigestion might result from the feeding of 1 per cent. of proteid in a weak stomach, and the same symptoms might continue until one cut down the caseinogen to 0.25. It was in this class of cases that one might be forced to dispense with caseinogen and feed nothing but whey proteid. His experience was that the newborn infant would tolerate almost any form of fat, sugar and proteid for a number of weeks because the stomach was healthy. The tendency today was to overfeed. This overfeeding was not limited to fats and proteids, but extended to carbohydrate feeding. The laity had been educated to the belief that infants could not be healthy unless they showed weekly gains; hence stuffing with cream mixtures was in vogue. Rotch, in speaking of a feeding mixture that contained 3 per cent. of fat, mentioned an anxious mother who added a teaspoonful of cream to each feeding, thus changing the formula which should contain 3 per cent. of fat to one containing 6 per cent. The indiscriminate use of a heaping teaspoonful instead of level teaspoonful was another instance where the anxious and well-meaning mother intended to help the physician, but usually to the detriment of the baby. If proteid or fat incapacity caused severe gastric disturbance, such as vomiting, colic or lumpy stools, then the temporary substitution of whey, with or without condensed milk, was useful. Dr. Fischer said he had reported elsewhere several cases of pyloric spasm and, in 1 case, constant vomiting due to a very high fat. The chemical examination of the breast milk cleared the mystery, showing a 5 per cent. fat. By pumping off the milk and diluting it with two parts of water the food was tolerated. Thus it was apparent that what appeared to be an intolerance or a milk idiosyncrasy was really an irritability provoked by the abnormal ratio of the food elements. In some cases of artificial feeding the gastric machinery would not respond no matter how carefully the food elements were ordered. In addition to dyspeptic symptoms the infant would show atrophic symptoms and emaciate. In this class of cases cow's milk and all modifications of it should be stopped and human milk, and nothing but human milk, would prolong life and develop the infant.

Dr. Herman Schwarz, speaking of proteid incapacity or proteid idiosyncrasy, said that Finkelstein had reported a case of this kind resulting from taking but a few drops of cow's milk. It was remarkable how the ideas regarding proteid digestion had changed during the last four or five years. Some German had showed that the difficulties encountered in giving cow's milk were due to the casein. A greater number of cases of indigestion were due to the casein and to too high fat. Czerny had made the statement that there was no such thing as casein indigestion.

Dr. Henry Dwight Chapin said that perhaps he had not made himself clear on the point Dr. Freeman referred to. He did not mean that complete proteid incapacity was at all common, but he made a distinction between incapacity and idiosyncrasy. By changing the form of the proteid it could often be kept at the right point. Fresh air and proper hygienic surroundings would contribute proteid capacity. He said he would like to take up the cudgel for the fats.

Dr. Charles G. Kerley, speaking on sugar feeding, and in answer to Dr. Freeman's remarks, agreed that cane sugar was digestible and might take the place of milk sugar. Among poorer people and out-patient work, because of the cheapness of cane sugar, it had been employed by him for years. It could not be given in equal amounts, however, with milk sugar, grain for grain, but usually it had to be given in about one-half the quantity.

As relates to the starch digestive capacity of young infants, it had been demonstrated conclusively, both from the experimental and clinical standpoint, that the youngest child may digest starch.

Dr. John Howland referred to Dr. Morse's criticism, and said that he had purposely refrained from mentioning fat pertentages. Children undoubtedly vary greatly in their ability to handle fat, but, in the cases investigated by Steinitz, milk containing between 3.5 and 5.5 per cent. fat had been sufficient to determine a relative acidosis.

He did not mean to say, by any means, that skimmed milk should be used as a routine measure in infant feeding, but thought that the most frequent mistake in infant feeding was to use too high a percentage of fat.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, November 12, 1907.

David L. Edsall, M.D., President.

ULCER OF THE FRENUM LINGUÆ.

Dr. Herbert B. Carpenter showed an infant, thirteen months old, who had been breast-fed for one month, although the mother had phthisis, and was afterward fed from the bottle. The child had had intestinal indigestion and gained in weight very slowly. A month ago an ulcer was first noted on the frenum linguæ. It was about the size of a small pin-head, bled when washed, and steadily grew larger, extending almost to the tip of the tongue. The ulcer was round, one-third of an inch in diameter, with elevated edges. It was indurated and pale, with a yellowish center and slight purulent discharge. There had been little or no odor, and only slight increase in saliva. It was but moderately painful.

Examination of a smear from the ulcer showed many pus cells and bacteria. A culture showed mixed infection, staphylococci and streptococci.

Dr. Theodore Le Boutillier had recently seen a similar case in a child of eighteen months, with pertussis. This ulcer was one-half to three-quarters of an inch across; deep orange in color, without odor, discharge or pain. It in no way bothered the baby. He had also seen two other ulcers lately, much smaller, which occurred in children with pertussis.

Dr. Francis B. Jacobs had also seen a case very much like Dr. Carpenter's case.

Dr. J. Alison Scott said that the ulcer seemed to have much redundant tissue; he suggested making a section of the hypertrophied tissue. It might reveal a possible tuberculous cause.

ANTERIOR POLIOMYELITIS.

Drs. J. C. Gittings and S. S. Woody exhibited a case of acute anterior poliomyelitis in a boy two and one-half years. While in perfect health the child had fallen from his high-chair. On picking him up the mother found the legs paralyzed. During the next four days he is said to have been in a semi-stupor, with fever, twitching of arms when handled, spasmodic contraction of the muscles of the back and neck, partial opisthotonos, and occasional sharp cries, as of pain. The sphincters were unaffected and no general convulsions occurred. During the next two days the mental obscuration, fever and motor phenomena lessened. On admission to the Children's Hospital of the Mary J. Drexel Home on the seventh day (October 7, 1907), he presented a typical picture of the disease, viz., complete paralysis of the left thigh and leg; in the right leg slight motion in extensors and adductors of thigh and flexors of toes, with loss or diminution of reflexes and marked atrophy, but preservation of sensation. Electrical tests showed failure to respond to faradism. There has been practically no improvement since admission.

A second case, a girl three and one-half years old, was briefly reported. She had fallen down a flight of stairs one afternoon, but in spite of evident bruises over the lower spinal region had been able to walk after the accident, and was apparently well when she went to bed. Next morning, on awakening, her legs were found paralyzed and she showed mild symptoms of infection. As a strange coincidence, the paralysis had practically the same distribution as in Case I.

These cases are examples of a rather unusual form of onset, and explain the prevalent lay idea as to the influence of traumatism. In the case of the boy the fall possibly was caused by the rapidly appearing paralysis, as his subsequent symptoms showed a severe form of the disease. In the case of the girl, if the account was true, the fall had no direct relation.

EXHIBITION OF TWO CRETINS.

Dr. E. E. Graham showed a cretin aged eighteen years. Dentition was at eighteen months; he still showed some primary teeth. He did not walk till six years old; intelligence was apparently normal until two years of age. He is now only thirty-seven and one-half inches tall, although when seven years old he measured thirty-six inches.

The second cretin was a girl of eight years. Dentition was at twelve months; anterior fontanel closed at second year. She was thirty-four inches high and looked like a girl of three or four years. She had not grown any in five years. Mentally she was like a child of three. She began to walk at three years; to talk at four years. She had been taking thyroid extract for just one month, and had improved greatly upon it.

CONGENITAL HEART DISEASE.

Dr. Graham showed also a girl of five months with this affection. Her heart action was rapid, and there was a loud, blowing, systolic murmur heard all over the sternum, most marked at the base. There was no cyanosis. Her breathing resembled closely the respiration of inspiratory dyspnea. At each inspiration the sternum was drawn in and there was depression of the suprasternal notch and supraclavicular spaces. On percussion, the heart seemed to be enlarged; a distinct thrill was felt over the cardiac area. There was no clubbing of the fingers, and the hands and feet were warm. In view of the absence of cyanosis and the enlargement of the right heart, it seemed as if the condition was a congenital heart lesion, probably a deficiency of the intraventricular septum, patent foramen ovale or patent ductus arteriosus. The family history showed no syphilis, tuberculosis or rheumatism.

Dr. M. Howard Fussell said that to make an exact diagnosis in congenital heart disease seems impossible. He had reported a case some years ago, in which there was one auricle and two ventricles, although the left ventricle did not functionate. The child had a systolic murmur, but no cyanosis appeared until it was four years old. It died when five years of age.

CONGENITAL DISLOCATION OF THE KNEE.

Dr. J. Torrance Rugh showed this case—a baby of ten months.

Dr. James K. Young said that he had reported 2 similar cases some years ago. One was single, the other double. They both recovered.

WRY NECK FROM EXTENSIVE BURNS.

Dr. Young showed a colored boy, aged seven years, who was scalded March 25, 1907, over the face, ears, back of ears, sides and back of scalp, neck, shoulders, back and upper third of arms. There was no deformity before the burns, but the anterior cervical glands were considerably enlarged. He was delirious for two weeks and ran a temperature for weeks, lying on his back with his head turned to one side or the other. During the first week he kept it turned to the right, but it was gradually got over to the left by changing his position. He complained of such severe occipital pain when he lay on the occiput that it was impossible to keep him that way. During the second and third week the deeper skin sloughs came off and his condition was so serious that it was impossible to change the position of his head. He became cyanosed several times and was kept up on saline solution and stimulants. By the time he was in a condition to be handled his head was so firmly held to the left that it could not be changed. He had had massage and exercises for four months. Before that the left shoulder was slightly raised and his chin rested on the shoulder. His treatment will now consist of massage and exercise, and later some skin operation perhaps. Dr. Young said that keloids were as common in colored children as in colored adults.

ANTERIOR POLIOMYELITIS.

Dr. R. S. McCombs read a paper on the prevalence of acute anterior poliomyelitis, giving statistics from the Children's Hospital of Philadelphia.

(This paper was published in full in Archives of Pediatrics, January, 1908, p. 36.)

Dr. Young said that at the Polyclinic Hospital this disease does not appear to have been epidemic this fall. Regression usually begins at six weeks, so we would not expect it yet in the cases reported by Dr. Gittings.

Dr. Herbert Fox said that the Health Department of Pennsylvania had its attention called to the 12 cases of anterior poliomyelitis in Eau Claire, a small town in Butler County. Fourteen cases developed and an effort was made to trace the transmission. The town runs along a ridge, and water and milk as means of transmission were excluded. Insects were also excluded, flies being investigated in vain. The disease attacked both careful and careless families alike. The abortive cases had the evidences of an acute infection, but there was only a transient weakness of the extremities, no paralysis. No connection could be found there between these abortive cases and the true cases with paralysis.

But in Oil City it was distinctly the middle class which showed the most cases. Here Dr. Fox obtained several sterile lumbar punctures. These cases showed a rapid rise of temperature, obstinate constipation and vomiting. No catarrhal symptoms were noted in the nose and throat, but they were present in the eyes. Pains in the legs and thighs were common, until the paralysis appeared; later the pains sometimes returned. Distinct rigidity of the neck, with retraction of the head, was common. Four cases were rapidly fatal, and in these cases the head was retracted and the thighs and legs flexed. Here the spinal fluid was found to be in excess, clear and limpid, containing very few mononuclear leukocytes. The fulminating cases, with symptoms of acute infection and cerebral pressure, all developed within twenty-four hours. In the 1 case which came to autopsy, no excess of cerebrospinal fluid was found. Examination of the noses and throats of both sick and well had not led to any conclusive bacteriological results. The results of this infection conform to those of the Norwegian observers and seem to indicate that poliomyelitis, like cerebrospinal fever, is "in the air."

Dr. F. W. Loughran, of New York, said that there were a large number of the fatal cases in New York, many resembling cerebrospinal meningitis; in these cases lumbar puncture withdrew a sterile fluid. They were often preceded by evidences of intestinal intoxication. In some cases, on account of the pain, the diagnosis of neuritis, or even rheumatism, was made. After the pain and irritation of the muscles have disappeared, Dr. Loughran advised rest for the affected limb in a plaster cast, which was removed twice a day in order to produce hyperemia by the Bier-Klapp method, which causes excellent functional recovery. No atrophy of the muscles resulted after three months' treatment. The cases occurred mainly in low-lying districts where water courses had dried up.

Dr. T. H. Weisenburg said that he had noted an increase in the number of cases of acute anterior poliomyelitis since July. The cases were more severe than ordinarily in that both lower limbs were extensively involved, and in 2 cases the abdominal muscles were also affected. This condition is rare, only 9 cases having recently been found in the literature. In some of the cases there were meningeal symptoms and in most of them pains in the limbs. This can be accounted for by the accompanying neuritis, for in nearly all the cases there was pain on pressure over the nerve trunks. The latter is not an unusual symptom, as it is present in all cases if looked for early.

He said that pathologically the disease was an acute infection, and microscopically a degeneration of nearly all of the cells of the anterior horn of the spinal cord throughout its whole extent was found. There was always congestion of the blood vessels with leukocytic infiltration and often hemorrhages. The reason we found a greater involvement of one limb was the weakness of the part, or the fact that the disease always manifested itself more in those parts which were most used. The fact that nothing had been found in the cerebrospinal fluid did not argue against an acute infection, for this disease was not one in which the brain and cord were alone involved. It was a general infection, with general symptoms of an acute intoxication and the paretic symptoms coming on afterward. It was probable that, if we were to examine more closely the different organs of the body, we should find a similar degeneration of structure. We did not have, then, a spinal-cord disease alone. It would be wise to examine all of the secretions of the body, especially the blood.

Dr. H. B. Carpenter said that he usually saw 2 or 3 cases a year; this year there had been 13 cases during his three months' term of service—August, September and October. The illness came on over night usually, and the patients did not come from any one portion of the city. All occurred in children under four years of age. In 1 case, a week before the child became ill, a sister had died of cerebrospinal meningitis.

Dr. S. McC. Hamill spoke of the dissimilarity between the epidemic and sporadic types of the disease. He pointed out the widespread distribution of the lesions in the epidemic type, referring especially to the recent reports of Harbitz and Scheel on the pathology of the epidemics occurring in Norway, and spoke of the view expressed by them that, in all cases, the pia mater was the first portion of the nervous system to be involved. Both clinically and pathologically some of their cases simulated Landry's paralysis, transverse myelitis, etc.

The reports upon the pathological findings in the various epidemics have given us an anatomical picture entirely unlike that we have found in the sporadic cases. On the basis of the age period at which epidemic cases occur, the epidemiology, symptomatology and pathological findings, he was inclined to believe that this so-called epidemic type of poliomyelitis is an infectious disease dependent upon an entirely different infecting organism.

Dr. Fussell thought the cases reported by Dr. McCombs resembled the sporadic rather than the more recently reported epidemic cases. There have been no cases in the part of the city in which he lives. Some physicians wrongly call their cases rheumatism, on account of the pain present.

Dr. Le Boutillier said he had had only 4 cases in the Polyclinic Hospital this fall, 2 of which came in within two days, both from the southeastern part of the city. At St. Christopher's Hospital for Children, in the northeastern part of the city, he had had no cases at all.

Dr. W. N. Bradley said that he had seen 10 or 15 cases this fall. They resemble the sporadic cases more than those recently reported as epidemic in New York. None of his cases have been fatal. Some of the cases seen at the Jefferson Hospital have come in from New Jersey.

Dr. J. Madison Taylor spoke of the treatment. He has seen a great number of cases late in the course of the disease, and recommends electricity and massage, which should be kept up for a long time.

Dr. Gittings said that, while one of his cases developed suddenly, a fulminating case, like many of those reported recently, the other resembled the sporadic cases.

Dr. McCombs said his cases resembled the sporadic cases, and were not like those reported in the epidemic in New York.

PRIMARY NASAL DIPHTHERIA.

Dr. G. W. Stimson read this paper, with report of several cases of primary nasal diphtheria, including one in an infant ten days old. He described the symptom-complex from 100 cases reported. The great majority of cases of malignant nasal diphtheria are secondary. Primary nasal diphtheria, usually mild and limited to the nose, sometimes extends downward and assumes a more malignant character. He traced instances of direct infection, proving this capable of acting as a focus of infection, cases resulting from which may be severe. The disease shows a tendency to reproduce itself or, at least, to cause a disease equally mild in character. Undoubtedly the mild type constitutes a large majority of all the cases that may be included under primary nasal diphtheria.

DR. J. P. CROZER GRIFFITH said that it would be very difficult to distinguish primary nasal diphtheria from that secondary to the involvement of the nasopharynx, were it not that diphtheria developing primarily in the latter position is usually of a severe form. We may conclude consequently that if the symptoms observed are very mild, the diphtheria is probably primary in the nose.

While primary nasal diphtheria is not generally serious to the patient, it is the most dangerous form for others, because so often overlooked and consequently so easily contracted. Any child, especially in a hospital, who develops an irritating nasal discharge, with little or no fever, and no evident constitutional symptoms, should awaken suspicion. It had repeatedly happened in his experience that such cases on examination had exhibited membrane within the nares, or even without this had revealed Klebs-Löffler bacilli. By this time the disease might have spread to other children in the ward, and diphtheria, not primary in the nose, might have developed.

THE GREEN STOOLS OF INFANTS.—Hecht (*Münch. Med. Woch.*, June 11, 1907) says that the degree of oxidation of the biliary coloring matter in the stools of infants does not depend wholly on the oxydasis, but a distinct influence is exerted on the coloring by the very uncertain, but usually significant, reducing power of the bacteria in the stool. The oxydasis can certainly develop its action only when the reduction process is so insignificant that the biliary coloring matter is unaffected. If the reducing power is increased in intensity the stool always contains somewhat reduced biliary coloring matter, preeminently bilirubin. The intestinal bacteria then hinder the oxidation of the biliary coloring matter so that such stools contain bilirubin in spite of the amount of oxydasis.—*New York Medical Journal.*

Current Literature.

Abstracts in this Number by

Dr. A. W. Bingham. Dr. M. Nicoll, Jr.
Dr. Alfred F. Hess. Dr. G. R. Pisek.

PATHOLOGY.

CHANTEMESSE, A.: L'OPHTHALMO-DIAGNOSTIC DE LA FIÈVRE TYPHOIDE. (*Deutsch. med. Woch.*, September 26, 1907, p. 1,572.)

Chantemesse describes a new diagnostic test for typhoid fever. This consists in instilling upon the conjunctiva of one eye a solution prepared from typhoid cultures; the method is given in full in the original article. If the patient has typhoid fever, there will be seen within three to ten hours following such an instillation a marked conjunctivitis, which will not be present in the other eye, nor in the eyes of healthy individuals. In 200 tests no disagreeable effects were experienced. In 50 persons convalescent from other diseases, no positive reaction was obtained; in 70 patients with a positive Widal reaction this test resulted likewise positively. Moreover, several times the author obtained a positive ophthalmo reaction when the Widal test was negative or did not become positive until later in the disease. As a word of warning, Chantemesse advises against the use of this reaction in all subjects whose conjunctivæ do not appear perfectly normal. ALFRED F. HESS.

MEDICINE.

BELLAMY, G. E.: CASE OF BRONCHIAL DIPHTHERIA. (*British Medical Journal*, June 29, 1907, p. 7,537.)

A boy of eight, after a few days of general malaise, developed a nasal catarrh with a slight cough and sore throat, but continued to go to school for five days. He was then noticed to be gradually losing his voice, his nose bled occasionally, and he was unable to breathe through it. On the tenth day he was medically examined. The temperature was 101.4°F., there was a serosanguinous discharge from both nostrils, redness of pharynx, a few whitish-yellow follicles on the enlarged tonsils.

Except for harsh expiration, lung sounds were normal. Urine was albuminous. The same evening, two separate white fibrinous casts, apparently of the two main bronchi, were coughed up.

Each cast was three inches long and one-third inch in diameter; thin walled but firm. Later a third cast was coughed up. Klebs-Löffler bacilli were present in the throat and casts. The casts seemed to be of primary formation in the bronchi and did not result from an extension of membrane from the larynx. There was no secondary bronchitis or bronchopneumonia.

A. W. BINGHAM.

PÉHU, M.: THE EFFECT OF TYPHOID FEVER ON THE NURSLING. (*La Pathologie Infantile,* April 15, 1907, p. 73.)

Typhoid fever in a nursing woman does not increase the gravity of the disease, or present any special symptoms. From a number of observations it may be stated that the nursling is very exceptionally infected through the breast milk. However, as soon as the diagnosis has been established the baby should be separated from the nurse. M. NICOLL, JR.

HYGIENE AND THERAPEUTICS.

NIKITIN, D. V.: STREPTOCOCCUS SERUM AS A PROPHYLACTIC MEASURE IN SCARLET FEVER. (*Russki Vratch,* August 3, 1907, Vol. VI., p. 989.)

During an epidemic of scarlet fever in Russia, Nikitin injected streptococcus serum 1,187 times in 767 exposed persons, of whom 147 received the injections three times, 106 twice, and 528 only once. Of this number only 8 children were afterward infected, and they all had been inoculated only once. The author makes the following observations: (1) The disease produced by injections is identical with the real scarlet fever, but lasts at most only two to three days. (2) The injection is harmless. (3) Immunization is accomplished only by repeated injections, *i.e.,* two or three times. (4) The serum injection decreases the number of cases of scarlet fever and is a means of checking epidemics in towns or villages. (5) Patients with any febrile reaction should not be inoculated. (6) Nephritic involvement is also a contraindication.

The amount injected to a healthy normal child up to ten years was as many cubic millimeters as there were years of life. Over ten years of age 1 c.c., or, at most, 1.5 c.c.

G. R. PISEK.

ARCHIVES OF PEDIATRICS.

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Original Communications.

THE RELATION OF THE BACILLI BELONGING TO THE SO-CALLED DYSENTERY GROUP TO THE DIARRHEAL AFFECTIONS OF INFANTS.*

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It is with much misgiving that at the request of our President this paper has been prepared upon "the relation of the bacilli belonging to the dysentery group to the diarrheal diseases of infancy."

The present is a particularly inopportune time for any satisfactory statement in this field of observation and investigation.

A few years ago, in reliance upon the highest authorities, one could express the opinion that although many of the diarrheal conditions especially prevalent among infants and young children during the heat of the summer months were probably infectious, and produced directly or indirectly by bacteria, no one variety of germ was to be associated with a large group of these cases.

The infant death-rate from diarrheal diseases in our crowded communities, recurring with the return of the summer season, although considerably lowered in recent years, still assumes the proportion of a devastating epidemic. Few civilized temperate communities escape, but the mortality seems highest in some of the larger cities on the Atlantic seaboard.

Although young children are particularly prone to diarrheal diseases, these disorders are not infrequent among adults, and have occurred in epidemics from time to time in all countries, especially in those having a warm climate.

Epidemic diarrhea or dysentery has played a gruesome part in many extended military campaigns of ancient and modern times.

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Its ravages during our Civil and Spanish-American Wars are notorious. The infectious nature of these cases was long suspected, but it remained for the distinguished Japanese investigator, Shiga,[1] to associate a hitherto undescribed microorganism with a number of cases of acute diarrhea which occurred in Tokio in 1897 and 1898, and, after a thorough study, to announce the so-called Shiga, or dysentery bacillus, to be the cause of acute epidemic dysentery in Japan. It seems that Japan has been swept repeatedly by severe epidemics of dysentery. The number of those affected has reached 125,000 in a single year. A few sporadic cases are always present. Nearly all the susceptible persons contract the disease, which varies greatly in severity from an indisposition of a few days' duration to a rapidly fatal illness, associated with marked ulceration and necrosis of the intestinal mucosa.

The history of our knowledge of the dysentery bacillus has been recited so often that it need not be repeated here. The same or a very closely-related organism was shortly afterward found by Flexner,[2] in cases of epidemic diarrhea occurring in the Philippines, and since then numerous epidemics in various parts of Europe, China, India, Porto Rico, Central America and in the United States have all been proved to be due to this group of bacilli.

The organism is found in the dejecta of the patients, embedded in the intestinal mucosa and in the adjacent lymphatic glands, very rarely in the other organs or in the circulation. It is agglutinated usually by the blood of the patient and is pathogenic to animals. In some instances, an intestinal condition very similar to true dysentery has been produced experimentally.

During the summer of 1902, while investigating a series of infants suffering from diarrheal disorders, Duval and Bassett[3] found the dysentery bacillus in 42 out of 53 cases examined. A careful consideration of the clinical histories of these patients failed to disclose that the particular infants studied exhibited any symptoms uncommon in the usual diarrheal disorders of the summer. In the group were babies evidently acutely toxic, and others in whom the tenesmus and the character of their stools indicated an inflammatory involvement of the lower bowel. There was no macroscopic blood in the discharges of 13 cases, and blood was present only as an occasional fleck in 18 additional instances.

The organisms isolated agglutinated in high dilutions with antidysenteric serum, and were markedly pathogenic.

It seemed, therefore, that there was good reason for the supposition that a number of the intestinal disorders occurring among infants and young children in the warm weather were produced by the dysentery bacillus, shown to be the cause of many epidemics of dysentery among adults.

It was necessary, however, to have these important findings confirmed, and to determine whether the same organism could be associated with the diarrheas of children in other localities. Accordingly, the following summer, the Rockefeller Institute for Medical Research, under whose direction the first investigation in children was made, undertook a collective research in several of our large cities. The results of these studies as collected by Drs. Flexner and Holt are well known.[4]

Previous to this work, however, it had been found that several types of dysentery bacilli could be distinguished by differing agglutination reactions and by certain cultural properties in the presence of special carbohydrates.

It was shown that there were at least two distinct varieties, one represented by the original organism isolated by Shiga, and the other by the bacillus discovered by Flexner in epidemic dysentery in the Philippines. One or the other of these two chief types has been present in the European epidemics. It became of interest therefore to determine which variety of the dysentery organism was most concerned in the diarrheas of infancy.

Of the 412 infants made the subjects of the investigation referred to, some variety of the dysentery bacillus was found in 279 instances, or 63.2 per cent. There were marked differences in the percentage of successful isolations in the hands of the various workers.

A very large proportion of the organisms isolated belonged to the so-called Flexner type, including the closely related "Y" organism of Hiss. The clinical manifestations presented the same variations wherever studied. It was shown that infection with the dysentery bacillus was associated with almost every sort of intestinal disturbance accompanied by diarrhea, except with cholera infantum, of which rare condition no cases were studied. This bacillus was more prevalent in the inflammatory forms of diarrhea, but was found in affections of all degrees of severity, the mildest and the most severe, the acute, the protracted and the subacute, and often occurring in institutions during the summer as a terminal infection.

No such extended work upon this important subject has been since undertaken. It can be regarded as proved that the same proof exists for the causal association of bacilli of the dysentery group with a fairly large number of the diarrheas in infants, occurring along the Atlantic seaboard, as is at hand to prove that the same bacillus produces epidemic dysentery in adults.

There were many questions, however, left unsettled in this investigation. Upon some of them additional light has been shed by more recent studies, others remain unsolved.

In the first place, the rôle played by other organisms or their products in the production of a large number of these cases is probably still a large one.

More than twenty years ago Escherich pointed out that there were varieties of the colon group—as a rule, normal and harmless inhabitants of the intestinal tract—which were highly toxic and irritant to the intestinal mucosa.

Some years later, in an exceedingly thorough research, which seems to have attracted much less attention than it deserves, Flügge[5] demonstrated the presence in milk of several strains of anerobic bacteria and of peptonizing bacteria, which produced spores and were not destroyed by the ordinary methods of sterilization and which produced markedly toxic effects upon laboratory animals. He called attention to the fact that the spores of these peptonizing bacteria, remaining viable, rapidly multiply in milk even at a moderately low temperature. They do not curdle the milk, but bring about marked changes in that medium before their presence is recognized. The destruction of the ordinary lactic acid bacteria, by imperfect sterilization, increases the rapidity of their growth. Flügge considers that many of the diarrheas occurring among young children in the summer are due to these more or less neglected organisms.

Tissier[6] has recently called attention to an anerobic peptonizing bacillus, which he considers to be the cause of certain diarrheal cases. This writer, Moro[7] and Dunn[8] and others have reported favorable results in treatment from the ingestion of lactic acid producing bacteria known to be antagonistic to certain forms of fermentation.

Many observers have demonstrated the presence of streptococci in the diarrheal stools of these cases. It is still undetermined whether they are not for the most part secondary invaders, as they have been shown to be in other conditions; and perhaps more concerned with the production of the anatomical changes in the intestinal mucosa than in the primary infection. Moreover, streptococci are frequently found in normal stools. The streptococci isolated are often pathogenic to laboratory animals. The B. Proteus vulgaris is usually found in the dejecta, and has been occasionally shown to be definitely toxic. The same is true of a number of other bacteria of the intestinal flora. Several epidemics of diarrhea due to the action of bacillus pyocyaneus have been described, notably by Lartigau,[9] Calmette and Maggiora.

Undoubtedly certain cases of diarrhea in children are not produced directly by bacteria at all, but as the result of the poisonous or irritant character of the ingested food. The acids of fruits, the toxins of fish, various vegetables, ice-cream, and of the other substances giving rise to so-called ptomain poisoning, are all associated with diarrhea. Other forms are purely nervous in origin.

Moreover, it must be freely granted that in many of the cases of intestinal disorder reported as produced by the dysentery bacillus, that organism has been found in the stools in very small numbers, two or more colonies among many of colon bacilli or other organisms on the plates.

It is well known that dysentery bacilli are rather difficult to detect unless the investigator has had some special training, although it may well be true that the presence of a single definite dysentery bacillus in the dejecta may be evidence that there are many more in the intestines. A similar inference would be justified from the isolation of a single typhoid bacillus from the stools.

On the other hand, there have been a few observations in which dysentery bacilli have been found in small numbers in the discharges of apparently normal infants. The importance of the investigation of normal stools for the dysentery bacillus was of course recognized from the beginning, and many attempts have been made to find it, for the most part without success. In practically every instance in which the dysentery bacillus has been isolated from normal stools, the child had either previously had diarrhea, or had been exposed to infection from other cases.[10] Further evidence is therefore needed to sustain the claim of some who consider the dysentery bacillus a normal inhabitant of the infant's intestinal tract, although this statement cannot at present be categorically denied.

On the other hand, it is known that dysentery bacilli may persist for a long time in the stools. Like typhoid bacilli, they may be present in convalescent cases and in the dejecta of well persons who have been exposed to infection without setting up an illness. It is easily conceivable that under these circumstances an intercurrent diarrhea may be induced by another cause, mechanical, nervous, toxic or bacterial, and which may or may not be followed by infection with the dysentery bacillus.

Nevertheless, the conclusion would seem warranted that when there are found in an infant's diarrheal stools many organisms of proved pathogenic properties, and which are known to be the cause of a severe form of dysentery, that these organisms should be considered causally related to the intestinal disorder. This assumption is strengthened when the bacilli in question are agglutinated by the patient's blood.

From the time of the association of the dysentery bacillus with many of the intestinal disorders of infants, attempts have been made to connect this organism with some definite clinical type of disease. These efforts have been unsatisfactory. Wherever a series of cases of infantile diarrhea, occurring along our Atlantic coast in summer, has been thoroughly studied by competent bacteriologists, in a considerable number of instances dysentery bacilli have been found. Such a series includes, according to careful clinical observers, the so-called acute toxic cases, with or without marked alteration of the intestinal mucosa, as well as those of longer duration, many of them with extensive destruction of the intestinal mucous membrane. As was shown in the collective investigation, a large number of the infants affected were suffering from previous malnutrition. It would seem therefore unsatisfactory, after deducting the diarrheas of nervous or mechanical origin, to attempt any etiological classification without proof in each case.

The division of the dysentery bacilli into groups has been of special interest to pediatricians, for it was soon found that infants were comparatively rarely affected by the variety described by Shiga, but in the majority of instances by the strain first isolated by Flexner in the Philippines, or by one of several closely related varieties.

In the experience of Dr. Park,[11] of New York, infection with the true Shiga bacillus is more apt to be severe than is that with the Flexner type. Escherich finds this to be true of children in Vienna. Kruse has sought to limit the term "dysentery bacillus" to the original Shiga type, calling all other related organisms pseudodysentery bacilli.* This conception will probably be shown to be incorrect, for subsequent study by Shiga and others indicates that in Japan there is also a *group* of dysentery bacilli, all associated with the disease.

Ohno,[12] a Japanese bacteriologist, after an exhaustive study, is able to distinguish 15 sub-groups of dysentery bacilli, because of slightly different action on various carbohydrates. In his opinion, there is no special reason for the separation of dysentery bacilli into acid and non-acid types from their action on mannite, as both types produce severe symptoms in both sporadic and epidemic cases. The true Shiga bacillus, he asserts, may produce mild cases. Moreover, the grouping of the organisms, isolated according to their fermentations, does not correspond in his experience to the differences as made out by agglutination and bacteriolytic tests.

Dopter,[13] in France, also holds that there is a specific unity among the various types and that they should all be called dysentery bacilli.

Russian and Japanese bacteriologists found both the Shiga and Flexner types of the dysentery bacilli in the limited outbreaks that occurred among the troops in Manchuria during the recent war.

Subsequent experience confirms the early statements that the diarrheal conditions in infants and young children are more often associated with the Flexner variety, or some of the types very closely related to it, than with the original Shiga strain. Several types may be found together. Thus, in the examination of a consecutive series of 74 cases of infantile diarrhea, occurring two years ago in Baltimore,[14] the dysentery bacillus was isolated from 42 cases. Of these cases, in but 3 was the original Shiga type of dysentery bacillus isolated alone; in 14 cases the variety known as the Hiss "Y," very closely related to the Flexner bacillus, was found alone; the latter was present alone in 6 cases, while in 13 instances more than one variety of dysentery bacilli was isolated. In 11 additional cases, pathogenic streptococci were found in association with some form of dysentery bacillus. Although this series is much too small to justify any dogmatic statement, the study suggested that the severest disorders take place in children infected with more than one variety of dysentery bacillus, or where streptococci are present in association with dysentery bacilli. Of the cases in which a single type was found alone, those from which the Hiss "Y" variety was isolated seemed most severe. The cases in the series in which the original Shiga type was found were too few to lead to any conclusion as to the comparative toxicity of that organism. The statement of Park, Escherich, Kruse and others that, as a rule, infections with this particular variety are more severe, could not be controverted by our experience.

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* So impressed is Park with the greater severity of the infections with the original Shiga cultures that he suggests calling all other types "paradysentery bacilli."

Jehle and Charleton,[15] in an outbreak of diarrhea in the clinic of Professor Escherich at Vienna, some years ago, found the Flexner form somewhat more often than the true Shiga bacillus. They were unable to isolate the organism in other varieties of intestinal disease. Later, Jehle[16] described dysentery bacilli of the Flexner type in an epidemic of diarrhea in the same clinic. He considers these cases quite distinct from summer diarrhea, but his clinical summaries, and, in a few instances, the autopsy findings, agree perfectly with many of the bedside and postmortem records in the large epidemics which sweep over our American cities each summer.

The Flexner bacillus has been isolated lately in France by Auché and Campana[17] from a large number of infants with mucous diarrhea, and, among others, Morgan,[18] in England, has found both forms of the dysentery bacillus, together with a motile bacillus, with which he is able to produce diarrhea in experimental animals, in a small number of similar cases.

A study of the probable manner in which the dysentery bacillus affects the intestinal tract has been made recently by Flexner and Street.[19] They show that Shiga and Flexner forms are about equally toxic, and that the latter variety produces a soluble toxin in the animal body. The intestinal lesions, edema, hemorrhages, and occasional necroses, which are more severe in the colon than elsewhere, are brought about by successive acts of excretion, largely by the colon, of the soluble toxins absorbed into the general circulation from the higher portions of the intestines.

The method of propagation of the dysentery bacillus is still largely undetermined, but several significant facts seem to be established in this connection. In the first place, dysentery bacilli apparently have no natural habitat outside the human body. They have never been found in animals except as the result of intimate exposure from infected cases, or from direct inoculation. Moreover, the life of all varieties of the dysentery bacillus is comparatively short outside the body. According to Frost and Whitman,[20] these bacilli may live from four to nine days on merchandise, such as paper, cloth, wood, at a temperature of 17° to 20° C.; while on dried food substances, such as bread, albumen balls, they may survive nearly a month; and in sterile milk until the media is dried up; in sterile water its life is short, rarely more than a week. The Shiga is less resistant than the Flexner-Harris type.

The viability of the organism in water has lately been tested by Vincent.[21] He finds that it may live twelve to fourteen days in sterile distilled water, not so long in sterile spring or river water. The organism lives longer in the dark and at low temperatures. It is very sensitive to direct sunlight, being killed in two and one-half hours in running water exposed to the light. It never multiplies in water, and is destroyed in two to six days in water by saprophytic bacteria.

Again, there is abundant evidence that dysentery bacilli may remain viable for long periods in the intestines of patients after the cessation of all symptoms; they may be harbored, also, by persons who have been exposed to infected patients and who themselves remain perfectly well.

This in recent years has been shown to be true of the typhoid bacillus by Koch, Remlinger[22] and others. It has been suggested that the principal retreat of these persistent typhoid bacilli is not the intestinal tract, but the bile ducts, from which they are swept at intervals into the duodenum. A similar condition may be true of the dysentery bacilli.

From these facts the conclusion at least seems probable that the organisms which produce epidemic dysentery among adults, and many cases of diarrheal disorders among infants and young children, are kept alive in the intestines of ill or convalescent patients, or of those who have been exposed to the disease. Sporadic cases, due to infection with the dysentery bacillus, have been repeatedly shown to occur here and there, throughout the year, in both adults and children. These provide the nidus for the outbreak which takes place among those more susceptible with the return of hot weather. It is of the utmost importance, therefore, that those having the care of these patients should carefully disinfect all the discharges, both urine and feces, as well as the bed-linen, clothes, etc., which have come in contact with the patient; in short, they must use all the precautions found of service in the prevention of typhoid fever.

During epidemics, water should be boiled, and all food, including milk, heated. In hospitals, the nurses, going from patient to patient, are a real source of danger unless great care is observed. Unquestionably insects, especially the common house-fly, can convey both typhoid and dysentery bacilli from stools to food.

The rôle played by other factors, even in cases known to be infected by the dysentery bacilli, is being more and more recognized. The large number of instances of terminal infection, following chronic and wasting diseases, has already been referred to. Moreover, there is frequently a history of some antecedent dietary indiscretion, which sets up a gastrointestinal indigestion, mild in itself, it may be, but sufficient to lower the body's resistance to a few dysentery bacilli present in the intestinal canal. These facts afford additional grounds for guarding against the less severe intestinal disturbances.

Shortly after the discovery by Shiga of the dysentery bacillus the treatment of bacillary dysentery by the use of antitoxin was undertaken. The results in Japan have been from the first highly encouraging. The serum was obtained from horses which had been gradually immunized against large doses of an active culture of the organism. The average death-rate from the disease was reduced from about 30 per cent. to less than 10 per cent., and a marked improvement in the symptoms was noticed in nearly all cases following the injection of the serum. Serum prepared in a similar manner has been repeatedly used in various outbreaks of dysentery in Europe. Although the results have not been so uniformly good, it seems undoubtedly true that, in many cases, it had a definite, specific curative effect. Laboratory studies showed that the antidysenteric serum protected susceptible animals from the lethal doses of dysentery bacilli. The serum itself was found to be harmless.

The association of the dysentery bacilli with many cases of infantile diarrhea naturally led to the hope that in the serum treatment an efficient curative remedy might be furnished for these disorders. A number of cases were so treated in Baltimore during the summer of 1902, and the next season a more extended test was carried on in several clinics as a part of the study directed by the Rockefeller Institute.[23] As is well known, the results obtained were disappointing. Of 87 cases, in only 12 was there any improvement noted after the injection of the serum, and in nearly all these cases the betterment might have been properly attributed to other factors. Many of the infants so treated were malnutritic, and most of them had been ill for several days before receiving the serum. Still, it was fair to conclude that for these disorders in young children the particular serum used was not curative.

Further experience with adults and children, and particularly laboratory experimentation, has done much to explain these unpromising results. Thus, it has been shown by Conradi, Neisser and Shiga, Rosenthal, Todd, Flexner, Kraus and Döerr and many others that bacilli belonging to the original Shiga strain produce, in cultures or in suspension, a definite soluble toxin, against which an antitoxin has been obtained from the serum of immunized animals. This serum has been shown by Kraus and Döerr to neutralize the toxin both *in vitro* and in the body of a susceptible animal, and to be curative when it follows the toxin, even after a considerable interval.

Moreover, in addition to the accumulation of experience with the serum in Japan, there is indisputable evidence of the therapeutic value of antidysenteric serum in a large number of dysenteric cases elsewhere.

Thus, in Moscow,[24] during an epidemic of dysentery, the mortality in a hospital in which antidysenteric serum was used was 4.5 per cent., as compared to more than 10 per cent. elsewhere; the average death-rate from the disease for more than ten years being 17 per cent. The serum apparently diminished the intensity of all symptoms and shortened the length of the illness.

During the Russian-Japanese War, at Kharbin and other places, the use of serum was followed by prompt and lasting improvement in the condition of the patients.

Striking results have also been reported by Rosculet[25] in Roumania. Forty-seven cases were treated by serum prepared by Kraus in Vienna. Improvement took place in a few hours after the injection. There were no deaths, although a mortality of 12 per cent. to 35 per cent. had been common in other epidemics. Three children, between two and three years of age, were included in the series. Only the Shiga variety of the dysentery bacillus was found.

An interesting experiment in prophylaxis is recounted. Eighteen persons who had been exposed to the disease were given 5 c.c. of the antitoxic serum. None contracted dysentery, while among a second series of 18, likewise exposed and receiving *no* serum, 14 developed the disease.

Ludke[26] has also reported a number of dysentery cases markedly improved by the Kraus serum. He has also produced a strong toxin by grinding the bacilli and extracting in salt solution.

The most outspoken testimony in support of the value of a specific serum in the treatment of bacillary dysentery is that of Vaillard and Dopter from the Pasteur Institute.[27] For the last four years these investigators have been immunizing horses against dysentery bacilli and their toxins, using cultures from Kruse's laboratory. They were able to obtain an antitoxic serum which has preventative and curative properties as against both the organism and its toxin.

This serum was used in 96 cases of various degrees of severity. In all cases there was improvement, as evidenced by a diminution in the number of stools, less tenesmus, less blood and by a more rapid recovery. The average duration of dysentery usually is ten to thirty days; that of the cases treated varied from two to six days. The dosage was varied from 20 to 100 c.c., according to the severity of the illness. The serum was more valuable when given early, though it had effect later in the disease. One case was treated successfully, beginning sixteen days after onset. They claim that the serum is equally efficacious against both Shiga and Flexner types, but, as they do not specifically assert that a mannite-fermenting organism was employed, Dr. Flexner thinks one of this group was not studied. No children were included in their series.

Jehle,[28] from Escherich's clinic, however, has reported 2 cases, four and one-half and two and one-half years of age, suffering from infection with the original Shiga strain, which were greatly helped by the Kraus serum.

More lately, Auché and Campana,[29] however, have treated 19 cases in children, varying in age from three weeks to twelve years, with uniformly good results. One case only died from a complicating bronchopneumonia. These writers emphasize that in children, particularly, the clinical picture produced by this infection varies greatly.

Some cases could only be told from simple diarrhea by the blood-reaction and the presence of bacilli in the stools. The writers assert that three forms of dysentery bacilli were found—the Shiga, the Flexner and the Strong—but that serum was more effective for those children infected with the original Shiga variety. The Flexner strain was found in the fatal case.

Further cases, 33 in all, are added by Campana[30] in a subsequent paper. In each, following the administration of serum, the stools became fewer, the pain less, and the general condition improved.

An examination of the reports here referred to, coming both from the laboratory and the bedside, tends to establish certain facts, and explain others which were before doubtful. It can no longer be questioned that the true Shiga bacillus does produce in culture media a soluble toxin, and that an antitoxin is produced in the blood of susceptible animals which is a valuable specific curative agent. It seems also to be true that there are several other closely-related strains of the dysentery bacillus which differ culturally but little from the original type and less from each other, which are almost, if not quite, as pathogenic for laboratory animals, but which do not lend themselves to the production of a soluble toxin, and against which no satisfactory antitoxin has been as yet produced.

Children are susceptible to infection by all three forms, but experience heretofore has shown that infants are rarely invaded by the original Shiga variety, and then after definite exposure to the disease in adults, but that strains of the dysentery bacilli, that ferment mannite, are much more frequently found in the widespread diarrheal disorders which affect infants in the summer.

It is, of course, recognized that gastrointestinal affections with diarrhea can be brought on by various indiscretions in diet, by mechanical and chemical means, and by other bacteria than dysentery bacilli, and also that some such disturbance frequently precedes infection with the dysentery bacillus. It is true also that the dysentery bacilli may be present in the dejecta of infants exposed to infection, without setting up any disorder until the patient's resistance is lowered. The organism probably has no natural habitat outside the body, and is kept alive by the occasional epidemics and the sporadic cases which occur throughout the year. The virulence of the infection and the character of the pathological changes in the intestines vary greatly. The presence of the pseudomembrane is much less common in children, perhaps because this lesion is especially produced by the original Shiga type.

Further study is needed to ascertain if there may not be found some clinical phenomena which can be more surely associated with infection with dysentery bacilli. The exact method of propagation of the disease also needs further investigation. It is quite possible that additional research will develop an antitoxin for the Flexner variety and its closely-related mannite-fermenting organisms. Kraus and Stenitzer[31] claim to have done this recently with some typhoid bacilli, which have been made to produce a soluble toxin from which an effective antitoxin has been made. Similar methods may succeed in the cases of the obdurate strains of dysentery bacilli.

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DISCUSSION.

DR. DUNN.—I have been working for a number of years with the dysentery bacillus and have worked in the laboratory with Duval, who is an expert in its isolation. Whether it is possible to recognize cases due to the dysentery bacillus clinically I am not yet satisfied, but I should like to say that I have reached the conclusion that it is possible to diagnose the different etiological types of diarrhea by clinical means. I think a great fault with those who have been engaged in investigating dysentery is that they fail to draw a sharp distinction between infecting organisms, which actually invade the tissues, and the saprophytic organisms. A sharp distinction should be drawn between the saprophytic organisms and those that actually invade the tissues. The presence of the dysentery bacillus in the intestines does not necessarily mean that the body has been invaded by it. I think it is possible clinically to separate off a group of diarrheas where true infection occurs. In the cases where I have been able to prove that true infection had occurred there was a very different clinical picture, characterized by persistent fever, resembling cases of typhoid or other infection. The majority of our cases did not have persistent fever; they tended rather to subnormal temperatures, and I believe they are due to the fermentation caused by a large variety of organisms in the intestinal contents. With these the dysentery bacillus may be present, without having invaded the tissues at all, or having any rôle in etiology.

DR. KNOX.—I was interested in Dr. Dunn's remarks and I am in accord with them in the main. We have not, however, been able to distinguish *clinically* in all cases those in which dysentery bacilli were found in the stools from those in which we were unable to isolate these organisms. In the future it may be found that the number of dysentery bacilli present has much to do with the nature of the infection. Unquestionably, diarrhea may be produced by mechanical causes or by fermentation processes of various kinds, without any definite association with dysentery bacilli. Yet these particular cases, because of contact with infected cases, may show in the movements occasionally dysentery bacilli. Again, infection with the dysentery bacilli may occasionally be of the mildest grade, producing little or no temperature, and affecting the stools only so much as to occasion a slightly increased mucous discharge. The more severe infections, associated with pus, mucus, and frequently blood in the movements, of course, can be usually diagnosed clinically. But it is felt that as at present mild cases of typhoid are distinguished with difficulty from continuous fevers of other causes, so there are a large number of cases produced by infection with dysentery bacilli, the nature of which can only be determined by laboratory investigation in each particular case.

THE NEED OF GREATER ACCURACY IN PRESCRIBING STARCH IN INFANT FEEDING.*

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The use of starch as a food for infants in the first year, in connection with modifications of milk, has been the subject of much discussion among pediatrists. In fact, at one time it assumed so much importance as to become almost a professional creed, by which physicians were termed believers or heretics. Perhaps the issue still persists and may furnish the material for future debates and wide differences of opinion. It is not the purpose of this paper to discuss the subject of starch digestion in infants nor the advisability of farinaceous food in the early months of life. What has impressed me in my reading and practice is the great indefiniteness and inexactness of physicians in their use of cereal decoctions. My plea here is neither for nor against their use, but that we may mutually accept a more scientific basis of administering starch, when in our individual opinions the need for it arises.

Infant feeding made great advances when the pediatrists of the country accepted the percentage basis of feeding, and cow's milk was prescribed for infants in percentages of fats, sugar and proteids. It matters little by what method one calculates these percentages: there are many accurate ways of obtaining the required formulæ, and each man will follow the system which appeals to him individually. It is, however, of unquestioned advantage to think and write in percentages, for in this way only may we express scientifically the manner in which the problems of infant feeding are to be worked out so that the experience of one man will be of value to another.

It is surprising that we have not before this evolved a practical method of prescribing starch in percentages as we have for years prescribed percentages of fats, sugar and proteids. Although this suggestion has been made before, by Dr. Rotch and perhaps by others, the idea has never been carried out practically so far as I know. The custom has been to use what is called barley water as a diluent. Each writer on infant feeding gives his formula for making barley water and his experience in its use, but if one will analyze the mixtures recommended, and then calculate the number of ounces of diluent which can possibly be used in different milk formulæ, one will discover the great variations in the percentages of starch that are given. It is my belief that this lack of uniformity of method in actual practice is partly responsible for the misunderstandings and difference of opinion as to an infant's ability to digest starch, and as to the advisability of giving it in the food in the early months of life.

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* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 9, 1907.

I have had analyzed for me by Mr. F. W. Howe decoctions of barley prepared according to the formulæ of six different writers. The results are seen in the following table:—

TABLE I.

No.	1	contained	0.64	per	cent.	of	starch
"	2	"	0.96	"	"	"	"
"	3	"	2.58	"	"	"	"
"	4	"	3.87	"	"	"	"
"	5	"	4.47	"	"	"	"
"	6	"	6.00	"	"	"	"

It is interesting to calculate maximum and minimum percentages of starch one would obtain in a very weak and a very strong milk formula by using as a diluent, in place of water, the cereal decoctions containing the minimum and the maximum amounts of starch as given in the above analyses.

A formula calling for 2 per cent. fat, 5 per cent. sugar and .25 per cent. proteids, requires 16 ounces of water as diluent in a 20-ounce mixture.

A formula calling for 4 per cent. fat, 7 per cent. sugar and 2.5 per cent. proteids, requires 4¾ ounces of water in a 20-ounce mixture.

If, then, we replace the water in each case by the cereal decoctions containing .64 per cent. starch and 6 per cent. starch, the resultant percentages of starch in the mixtures are seen in the following table:—

TABLE II.

With .64 per cent. starch decoction:—

Formula	1	(2, 5, .25)	gives	.51	per	cent.	starch	in	mixture
"	2	(4, 7, 2.50)	"	.15	"	"	"	"	"

With 6 per cent. starch decoction:—

Formula 1 (2, 5, .25) gives 4.8 per cent. starch in mixture
“ 2 (4, 7, 2.50) “ 1.42 “ “ “ “ “

No one will question the fact that it may make a great difference to a very young infant whether it receives .51 per cent. starch or 4.8 per cent. starch in its food.

Again, it is interesting to note that if one works with a stock decoction of starch, using it in each formula to replace the water, the practical result is to give a steadily diminishing percentage of starch, as the milk formula is increased in its percentages of fats, sugar and proteids, so that the infant, at the end of the year, when, presumably, it has the greatest power of digesting starch, is getting about one-third as much starch as in the beginning of the year, when its power of starch digestion is least developed.

An infant's ability to digest starch is undeveloped at birth, but increases with age. The logical method of giving starch, therefore, is to begin, at whatever age the physician may personally believe to be advisable, with small percentages which should be gradually increased. If this method were adopted and consistently worked out, the accumulating experiences of physicians would soon enable us to draw more definite conclusions than is now possible, both as to the advantages of giving starch in the early months of life and as to the limits of starch digestion in these months.

As a result of the work done by Mr. F. W. Howe and myself, the Walker-Gordon Milk Laboratories are now prepared to fill prescriptions of modified milk calling for definite percentages of starch in the form of barley or oats. High percentages of fats and proteids require so many ounces of milk and cream that the number of ounces of diluent grows progressively less as the composition of the food approaches that of whole milk. There are, therefore, limitations to the starch percentages which are possible, owing to this limitation in the amount of the diluent that may be used.

Mr. Howe analyzed a number of cereal decoctions made of Robinson's prepared barley and Health Food oat flour, taking in each case 2 and 3 ounces of the flour to 1 quart of water, cooking for one-half hour, and adding enough water to make up a full quart. The average of these analyses were as follows:—

Table III.

ANALYSES OF CEREAL DECOCTIONS.

	Solids.	Fats.	Proteids.	Starch.	Ash.
Oat flour, 2 ounces.....	3.52	.08	.41	2.99	.03
Barley flour, 2 ounces...	3.48	.02	.54	2.88	.03
Oat flour, 3 ounces.....	5.21	.11	.47	4.58	.05
Barley flour, 3 ounces...	5.19	.03	.68	4.43	.04

It will be seen by these figures:—

(1) That the barley and oat preparations made in the above way have practically the same composition.

(2) That 2 ounces of either flour to a quart give approximately a 3 per cent. starch solution.

(3) That 3 ounces of either flour to a quart give approximately a 4.50 per cent. starch solution.

(4) That the percentage of fat added to a mixture by the cereal is practically nothing.

(5) That the percentage of proteids added to a mixture by the cereal is very small. In the concentrated cereal decoction it averages about .50 per cent., but as the amount of the diluent in most milk mixtures is from one-quarter to one-half of the total amount, the amount of proteid contributed by the cereal would average from .12 to .25 per cent., and these percentages would be obtained only in case the concentrated cereal decoction was used. A thin decoction containing .64 per cent. starch would give only from .02 to .05 per cent. of proteid.

It was also found that the decoction made by using 2⅓ ounces of either barley or oat flour to a quart of water, cooking for thirty minutes and adding sufficient water to make one quart, yielded about 3.50 per cent. of starch and was as thick a solution as can conveniently be strained. This 3.50 per cent. decoction has therefore been adopted as the stock solution in the milk laboratories.

On this basis the amount of this stock cereal decoction to be added to any mixture of modified milk to obtain any percentage of starch can be easily calculated by the simple formula:—

$$\text{No. of ounces of cereal decoction} = \frac{\text{Starch percentage desired} \times \text{total ounces of mixture}}{3.50}$$

The adoption of this recipe for making the stock solution of cereal, together with the formula given, does away with the misleading terms of barley water and barley jelly, and enables us to calculate with ease and great accuracy any percentage of starch we desire to give, or at least any percentage which is within the possible limits.

The following table shows the practical limits of cereal mixtures in laboratory modifications:—

TABLE IV.

Any percentage of fat from 1 to 4 with
" " " sugar " 4 " 7
" " " proteid " 0.25 " 2
may be prescribed with
starch, 0.25 per cent.
" 0.50 " "
" 0.75 " "
" 1.00 " "
" 1.25 " "

If the fat percentage is 4, and the proteid is 2.25%, the starch cannot exceed 1.05%
" " " " " " " " 2.50 " " " " " 0.83 "
" " " " " " " " 3.00 " " " " " 0.30 "

By using 3 ounces of the flour to a quart of water, the stock solution of cereal gives 4.5 per cent. of starch, and if straining the solution is dispensed with, higher percentages can be given than in the above table, the limitations of which can be easily calculated by the general formula given above, 4.50 being substituted for the denominator 3.50.

DISCUSSION.

DR. SOUTHWORTH.—All of us who have attempted to reconcile the writings of different men concerning the use of cereal gruels have had an experience similar to that of Dr. Ladd. It is simply another demonstration that we cannot have a clear understanding of these things as long as we are all using different strengths of preparations and then discussing the results obtained from these entirely different standpoints. The great difficulty in arriving at any standardization of cereal gruels has been to get some method that was clear enough to be adapted not only to the laboratory methods but also to home modification, and I hope in closing Dr. Ladd will mention the simple way by which he measures the ounces of cereal flours. In home modification we have had to rely upon the inaccurate measurements by teaspoonfuls. Perhaps there is no way by which standardization can be popularized more readily than by placing this method in the hands of the Walker-Gordon laboratories, where we can become familiar with it and the results.

DR. LADD.—It is a very simple matter to give directions to the mother; an ounce of the flour by measure is practically the same as by weight, and if the same graduate is used as for the measurement of the milk, it corresponds so closely with the weight as to make but very little difference.

ETIOLOGY AND PREVENTION OF INFANTILE TUBERCULOSIS.—Calmette (*Presse Médicale,* Vol. XIV., pp. 103-4) remarks that the mesenteric glands in children are actual filters and that only fresh infection recurring again and again at short intervals is able to overcome this natural barrier. Whatever the mode of entrance of the bacilli, the first tuberculous lesion, he affirms, is always vascular. If inhalation were the most common mode of infection, lesions in the lungs and larynx would be much more prevalent among children. Whenever the bacilli enter by way of the skin, mucosa or air passages, there must have been some preexisting lesion at the point. Referring to the frequency of bovine tuberculosis in man, he states that physicians in the Morlaix region, where bovine tuberculosis is common, have informed him of many cases in which every child in a farmer's family developed tuberculosis, although none of the parents or other relatives seems to be affected. He reiterates his former assertions in regard to the intestinal origin of tuberculosis, pointing out that this does not necessarily mean infection by the food. The bacilli get into the alimentary canal in various ways. He urges others to make a practice of inoculating guinea-pigs with the mesenteric and mediastinal lymph nodes of children succumbing to pulmonary affections of all kinds. He is confident that they will find the mesenteric nodes affected by tubercle bacilli in nearly every instance. He has witnessed again and again that anthracosis develops in the lungs of children or young animals with great facility when inoculation tests show that the lymph glands are already tuberculous, while the particles of charcoal do not reach the lungs in the young when the mesenteric nodes are sound. The milk from suspected cows should be boiled and the lungs of children should be protected against dust, but, first of all, physicians should educate families to know that it is possible to avoid all contagion by simple observance of the most scrupulous cleanliness. The tubercle bacilli are generally introduced into the organism by way of the alimentary canal, in saliva or on contaminated articles of food. The principal sources of contagion are the soiled handkerchief, kisses, the creeping of the child on the floor and its habit of putting everything into its mouth.—*Journal of the American Medical Association.*

SPECIMENS AND PHOTOGRAPH OF RESECTED RIBS.*

BY FRANCIS HUBER, M.D.,
New York.

At the seventeenth session of this Society† the writer presented several specimens showing the pathological changes observed in the adjoining ribs in a few cases of empyema treated by simple incision and drainage by means of a single or double rubber tube, in which a sinus persisted.

As a further contribution to the subject, the accompanying interesting specimens and photograph are shown.

Specimen No. 1 was obtained from Rosie A., two years old, who entered the children's service, Beth Israel Hospital, February 6, 1906. She had been ill for ten days prior to admission. The prominent symptoms were cough, dyspnea and temperature. February 12th the affected side was incised and drained by means of a double rubber tube. The subsequent course was favorable, the little patient leaving the hospital April 1, 1906, full expansion of the lung having taken place. The wound had healed nicely and the child appeared to be well in every respect.

On December 23, 1906, the child was again admitted. The general condition was excellent. At the site of the original incision there was a small abscess with reddened surface, which had developed in the last ten days. This was incised, allowing about ℥iv of pus to escape. As the probe entered the pleura for the distance of about two inches, two ribs joined by a bony bridge were resected. The secondary cavity covered by the above-mentioned ribs, about two and three-quarters inches in length, was fully exposed, packed with sterile gauze and dressed in the usual manner. The subsequent course was uneventful; the wound was firmly healed by January 20, 1907. Patient discharged January 30, 1907, in excellent condition.

Specimen No. 2.—Patient two and one-half years old. Simple rib resection performed October 9, 1906. In this case the pleura was not opened by an intercostal incision, but the structures posterior to the resected rib were torn through and drained. The wound healed kindly in about six weeks. Nothing abnormal noted until February 21, 1907, when a small abscess appeared. This was opened and found to lead down to, but not through, the pleura. The resected bone was found to be a newly-formed section, replacing the portion taken away at the first operation. The peculiar appearance is due to the manner in which the periosteum was lacerated at the time of the original incision and insertion of the drain on October 9, 1906.

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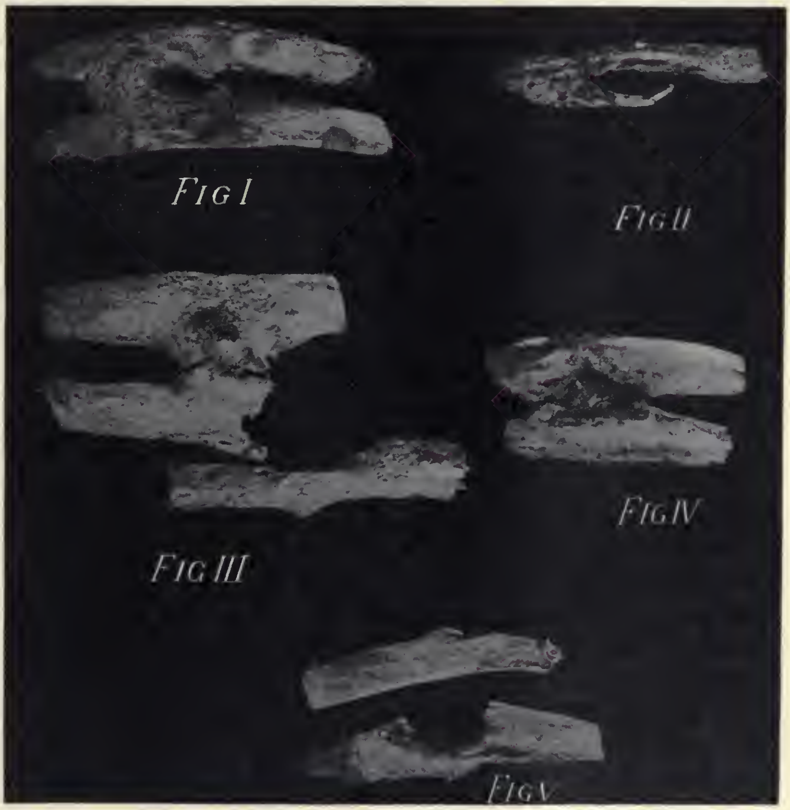
* Read by title at the Nineteenth Annual Meeting of the American Pediatric Society, Washington, D. C., May 9, 1907.

† ARCHIVES OF PEDIATRICS, April, 1906, p. 249.



Specimen No. 3 was obtained from a boy about five years of age, in whom several ribs had been resected some time before and in whose case quite a cavity remained. The operation was done for the purpose of obliterating the secreting surface and allowing the chest wall to fall in.

In the other 2 cases (Specimens Nos. 4 and 5), age fourteen and thirteen months, respectively, the original operation—simple incision and rubber drainage—was followed in both cases by a chronic pleural fistula of about four months' duration. Specimen No. 4 shows the bony bridge and groove.

In Specimen No. 5 the proper relations are not preserved. The upper rib ought to turn the other way, in order to show the actual position of the two ribs. As the new bony formations were rather delicate, the specimen is somewhat imperfect, the intermediate bridge having been destroyed in the dissection to free the ribs.

The ultimate results were excellent in both patients.

From a study of the specimens, it is evident that new bone formations may occur in cases of simple incision with drainage and also in cases in which there has been a primary resection of the ribs. In both varieties there has, unquestionably, been a solution of continuity of the edges of the costal periosteum, which, becoming everted, causes new bone to be thrown out and thus gives rise to the osteophytes and synostosis between the adjacent ribs. The presence of the drain plays an important part in the process in most cases. This is discussed at length in the original paper.

Specimen No. 1 is of particular interest, for it shows definitely that the process may occur in recent cases in which no sinus existed. The child was discharged April 1st, the wound having become closed, and remaining so, until a small abscess appeared at the site of the original incision, about December 15th of the same year—a period of about eight and one-half months.

In the other instances, excepting Specimen No. 3, which belongs in a different category and in which there was practically a restoration of the part resected, the cases were of a chronic type, with a persistent pleural sinus.

To Dr. I. S. Hirsch, radiographist at Beth Israel Hospital, I am indebted for the excellent photograph.

PERSISTENCY OF INFECTION IN SCARLET FEVER.—Berry (*Lancet*, January 12, 1907) found on investigation that in certain cases of scarlet fever the infection may remain in the patient for as long a time as two months. That is, the patient and not his clothing may spread the disease.—*Journal of American Medical Association.*

A CASE OF ARTICULAR RHEUMATISM IN AN INFANT.*

BY J. P. CROZER GRIFFITH, M.D.,
Philadelphia.

The occurrence of acute articular rheumatism in infancy is certainly rare. Thus, Rauchfuss saw only 1 case in 2,000 sucklings and Koplik 1 in 7,000 sick children. An extensive bibliography is given by Miller, who discussed the subject ably in a paper read before the American Pediatric Society a few years ago, analyzing all the cases published in medical literature as far as he was able to discover them (*Transactions of the American Pediatric Society,* 1899). He could find but 19 detailed which he felt warranted to be considered instances of the disease. Numbers of cases have doubtless erroneously been considered to be rheumatism. I have repeatedly seen instances where this mistake in diagnosis has been made in cases of scurvy, and I know that this has been the experience of many physicians. Indeed, the presumption in all painful affections of infancy is that we are in reality dealing with scurvy, gonorrheal or septic infection of the joints or some other affection rather than with rheumatism.

In view of the undoubted rarity of the disease, the following case appears to me to be of interest. It is, I consider, an instance of acute rheumatism of mild grade occurring in the first year of life—the only undoubted one which has come under my observation. Circumstances make the details in many respects incomplete.

N. F., born July 22, 1903. He was the youngest of five children, all of general good health, except for the occurrence of tuberculous cervical adenitis in the oldest. The parents were healthy and free from rheumatic tendency or syphilitic disease. The infant was breast-fed for the first nine weeks, and was then placed on a modified-milk formula, upon which he thrived, except for occasional slight attacks of indigestion. About the middle of March, 1904, being then eight months old, he developed fever with tenderness, redness, swelling, and pain on movement of the right ankle and right hand, in the latter locality the inflammation being situated chiefly in the little finger and the outer edge of the hand. The diagnosis of rheumatism was made and the child given sodium salicylate 1½ grains every three hours with a wet dressing to the inflamed regions. Under this treatment he improved. Examination on March 28th showed a subfebrile temperature and normal heart sounds. A relapse occurred about the end of the month, the temperature rose to 102° F. and over, pain returned in the right hand and ankle, and the right hip also became involved. To exclude the possibility of scurvy, although the disease did not really resemble it, orange juice was given, but without benefit. Oil of gaultheria externally was employed and sodium salicylate internally recommended. The hand rapidly improved, but the right leg remained swollen and tender, with the outer aspect of the ankle red and the knee hot to the touch. Fever persisted, although diminishing, and by April 5th the hand was practically well and the foot much better. The heart sounds were normal, and the urine showed no albumin. By April 8th he was nearly well. On April 15th, however, there was a return of the trouble and the treatment with oil of gaultheria and sodium salicylate was recommenced. From this time the condition remained subacute for over a month, the foot remaining slightly swollen and red and with little or no pain. Complete recovery then slowly followed.

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* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, D. C., May 7, 1907.

The course of this case is so characteristic of rheumatism as seen in adults that, with the absence of any other cause to explain the condition, the diagnosis of this disease seems to be beyond question.

FOLDS IN INFANTS' LEGS.—Cohn (*Jahrb. f. Kinderh.*, 1907) remarks that the folds and grooves in the legs and arms of plump infants have been studied by artists, but otherwise little attention has been paid to them. He ascribes their origin to the position of the child in the uterus. Asymmetry in the adductor fold suggests the possibility of congenital dislocation of the hip joint, before any other sign of it is apparent, although asymmetry is frequently observed in normal children. The depth of the grooves is an index of the child's general condition, as any affection tending to loss of flesh smooths out the grooves more or less, and they never return to the same extent.—*Journal of American Medical Association.*

CONGENITAL MALFORMATION OF THE ESOPHAGUS, WITH REPORT OF A CASE.

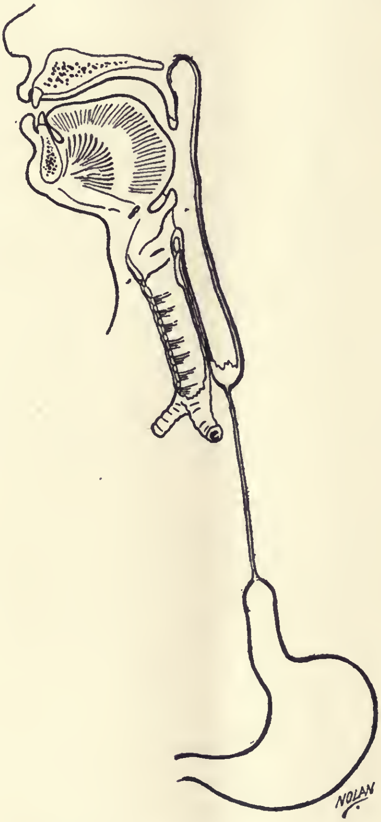
BY JOHN PHILLIPS, M.B. (TOR.),
Demonstrator of Medicine, Western Reserve University; Attending Physician to the Dispensary of the Babies' Dispensary and Hospital, Cleveland, Ohio.

The case I wish to report is that of a male white infant two days old, admitted to the Lakeside Hospital, August 13th, on the service of Dr. Henry S. Upson, to whom I am indebted for the privilege of reporting this case. Family history throws no light on the case. Though the presentation was normal, the labor was moderately difficult, forceps having been used. It took about thirty minutes after birth to resuscitate the child, who did not cry at all loudly for twenty-four hours, and showed no inclination to nurse. When fed with a medicine-dropper he would make an attempt to swallow, but the liquid, mixed with frothy mucus, would be regurgitated through the nose and mouth. Urination was normal, and meconium was passed during the first four days. After this, there was no bowel movement, and practically no urine was excreted.

Physical examination showed him to be a full-term child, weighing 4½ pounds. His face, hands and feet showed some cyanosis. He lay very quietly either on his back or right side, and would cry feebly if much disturbed. The fontanels, eyes, ears, nose and mouth were normal. From the nose and mouth considerable white frothy mucus escaped. The neck showed no rigidity, and there was no retraction of the head or glandular enlargement. The chest was well formed, but the breathing was shallow and somewhat labored. The costal margins showed a peculiar quivering motion during inspiration, which was prolonged. Slight impairment of resonance was found over both lungs posteriorly. The breath sounds could be feebly heard throughout the entire chest. The heart, abdomen, genitals, anus and extremities were apparently normal.

On giving the child water with a medicine-dropper the white frothy mucus from the nostrils and mouth increased, the breathing became more difficult, and, for a short time, the infant became very cyanotic. A soft rubber catheter was passed down the pharynx and esophagus and it stopped at a distance of 10 cm. from the gums. Two days before death a few fine moist râles were heard over the posterior part of both lungs. The child gradually grew weaker, his weight dropped to 3 pounds and 14 ounces, and he died on the ninth day after birth.

A postmortem examination was made ten hours after death by Dr. David Marine, whose report on the findings I have abbreviated below.



SCHEMATIC DRAWING SHOWING THE CONDITION EXISTING IN THE CASE PRESENTED.

On removing the tongue, pharynx and stomach *en masse,* it was found that the pharynx ended blindly 5 cm. below the base of the epiglottis, making a funnel-shaped pouch. In the gross there was no vestige of esophageal tissue visible below the pouch, there being only a thin mass of homogeneous fibrous tissue for 5 cm. along the aorta. Then extending from the cardiac end of the stomach was another blind tube which appeared to be the normal cardiac end of the esophagus, ending in a bag-like pouch.

The stomach was fetal, being a cylindrical tube 2 cm. in diameter, contracted and containing only a little stringy brown mucus. The intestine was normal, anatomically, 1 cm. in diameter, and contained only a small amount of mucus; the bile ducts were patent.

The thyroid was firm, dark red in color and enlarged symmetrically.

The kidneys were fused below, the fused portion crossing the middle line on the body of the second lumbar vertebra.

The right lung showed patchy consolidation in the posterior part of the upper lobe.

Microscopically, a section of the prevertebral tissue taken just below the blind end of the pharyngeal pouch showed a mass of smooth muscle tissue, the fibers of which were for the most part arranged longitudinally and surrounded by a vascular fibrous sheath. Near one edge of this muscular bundle were two masses of squamous epithelium with distinct lumina. They were placed side by side, but each epithelial mass was surrounded by its own fibro-muscular sheath. These two areas were taken for esophageal epithelium and were considered remnants of imperfect development. A section of the prevertebral tissue below this showed no vestige of esophageal elements.

Congenital malformation of the esophagus is a comparatively rare condition. The earliest recorded case is that of Durston in 1670. In 1880 Mackenzie carefully searched all the literature previous to that date and he was able to find 62 examples of this anomaly. In 1886 Solis-Cohen was able to find records of only 4 cases reported in this country, to which Marsh in 1902 added another. Recent additions to the literature of this condition have been made by Steele, Dickie and others. Dickie in 1906 says that he could find only 13 cases that had been reported since Mackenzie's scrutiny. However, it is probable that many examples of this anomaly are overlooked, for Hirschsprung, writing in 1860, mentioned 4 cases that he had personally observed in seven months in a town of only 180,000 inhabitants. Mackenzie suggests that if stillborn infants, and especially monsters, were subjected to careful postmortem examinations, this anomaly would be more frequently observed.

There is a remarkable uniformity in this abnormality. Of the 62 cases collected by Mackenzie, in 43 there was an intercommunication between the esophagus and the air passages with deficiency of a portion of the former, the communication being with the trachea in 40, and with one of the bronchi in 3. Of intercommunication between the esophagus and trachea, the esophagus being otherwise normal, there were 2 cases. Of blind termination, Mackenzie found 9, and of complete deficiency 5 examples on record. Marsh claims that 2 of these cases of complete deficiency, viz., those of Lozach and Heath, do not properly belong to this category. He claims that Lozach's case is the history of the dissection of a monstrosity with many anomalies, yet gives no very definite reason why it should not be included in this class. He states conclusively that the case of Heath was an example of congenital absence of the duodenum. Excluding these 2 cases, the 3 remaining, together with those reported by Steele and Marsh, make in all 5 cases of congenital absence of the entire esophagus. Of complete membranous obstruction of the esophagus there are 2 cases. Blasius has reported 1 case of longitudinal division of the esophagus.

Marsh gives the following classification of the malformations of the esophagus:—

1. There may be a congenital fistula of the neck, due to a want of closure between the second and third branchial arches and involving the esophagus.
2. The esophagus may be completely absent.
3. The esophagus may be obliterated only in certain portions of its extent.
4. There may be stenosis not amounting to complete obstruction.
5. There may be dilatation or diverticula.
6. There may be a fistulous communication with the trachea or with a bronchus.
7. There may be a double esophagus with reunion at the cardiac end.

In very few instances is this anomaly not associated with some other deformity. Of this condition, Mackenzie says: "In 1 instance there were spina bifida, absence of the anus, and a single horseshoe kidney placed over the spine. In 2 cases there was trifurcation of the trachea, and in 2 others there was pulmonary atelectasis. In another case the stomach and intestines were contracted. The other deformities associated in different cases with esophageal inosculation were: Malformation of the uterus, combination of the male and female genital organs; imperforate anus with a communication between the intestines and the bladder and deformity of the pelvis; absence of the right lung and atresia ani; imperforate anus with intercommunication between bladder and rectum, deficiency of the radius in each arm, and clubbed hands; imperforated anus with intercommunication between rectum and urethra and right auriculo-ventricular opening almost blocked by membranous diaphragm.

In only 3 instances is it expressly stated that there was no other deformity; while in 19 cases there is either no mention of the condition of the other organs, or it is formally stated they were not examined.

No very satisfactory explanation has yet been advanced for this defect. It cannot be due to a failure of communication between the primitive buccal cavity and the mesenteron, for His has shown that if a line be drawn from the arch of the lower jaw to the pouch of Rathke, this will represent the dividing line between the stomodeum and the structures of hypoblastic origin. Probably the best explanation is that given by Shattock in 1890 and quoted by Dickie in 1906. The former says: "In atresia of the esophagus it is the growth of the diverticulum from the anterior wall of the mesenteron (from which diverticulum are developed the lower part of the trachea and the lungs), which, by displacing forwards the hind wall of the mesenteron, leads conceivably to the secondary closure of the latter, *i.e.,* of the esophagus." In support of this is the anatomical fact that the esophagus diminishes in calibre at the level of the fourth dorsal vertebra. The larynx is usually unaffected, as it is developed independently of the pulmonary diverticulum.

The symptoms are so typical that the condition will at once be recognized. The child at birth may appear perfectly normal and attempt to nurse, but the milk will not be swallowed. If milk is given with a medicine-dropper it will precipitate a distressing attack of suffocation, the child becomes very cyanosed and the milk mixed with frothy mucus will be regurgitated through the mouth and nose. If a catheter be passed down the pharynx, the site of the obstruction will be revealed and the diagnosis confirmed. Meconium will be passed the first two or three days after birth, but after that time there is no bowel excretion. The infant gradually weakens, dying of exhaustion.

The cases invariably end fatally, the duration of life depending upon the vigor of the child at birth, the average being four or five days. The longest time recorded was twelve days. Gastrostomy has been tried in some cases, but unsuccessfully.

Since this paper was written, an infant three days old was admitted to Lakeside Hospital February 29, 1908, on the surgical service of Dr. Allen, with symptoms similar to those described in my case. The child died two days later and autopsy revealed the absence of a little more than one-third of the esophagus. No other malformation was present.

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7. Solis-Cohen. Ashhurst's Encyclopædia, Vol. VI., p. 19.
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WHITE-WINE WHEY IN INFANT FEEDING.—Myers and Still (*Lancet,* January 12, 1907) are very favorably impressed with the value of sherry-whey or white-wine whey as an infant's food, but state emphatically that like any other food which contains alcohol it should never be given to infants in larger quantities or continued for a longer period than the exigencies of the case require. They have often used it as the only food for a week or ten days, or given at alternative feedings, for two or three weeks. The whey is prepared by heating 10 ounces of milk until just boiling, then adding 2½ ounces of sherry, heating the mixture until it begins to boil up, when it is removed from the fire and allowed to stand a few minutes. The curd is then strained off through muslin. The whey is used when only small quantities of food can be tolerated and when a stimulant is necessary. To an infant six weeks old a tablespoonful can be given every half hour or every three-quarters of an hour, and the amount and interval gradually increased until 2 ounces are taken every two hours. In exceptional cases they have given 3 ounces, every three hours, to infants six months old, and even 4 ounces, every four hours, for two or three days to an infant twelve months old.—*Journal of American Medical Association.*

SARCOMA OF THE KIDNEY IN INFANCY.*

BY WILLIAM FITCH CHENEY, M.D.,

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and Physician to Lane Hospital, San Francisco, Cal.

On June 26, 1906, a male infant, aged twenty-two months, was referred to my care by Dr. J. L. Hardeman, of Porterville, Cal. The family history was negative. The boy was perfectly well at birth. When five months old he had pneumonia, with a protracted illness and a tedious recovery, the whole attack lasting six weeks. After that he remained well, except for occasional slight disturbance of digestion, until the present illness began.

About two months previous to the time he was brought to San Francisco, he was found to have a hard lump in the right side of his abdomen. The mother discovered this by accident while bathing him. It did not seem tender then or afterwards, nor did it appear to cause any symptoms. The lump grew rapidly larger, however, and was estimated to have increased to twice the size by the time he was brought to me for examination. But during this time of the tumor's enlargement, the child continued apparently well, with good appetite and digestion, regular evacuation of the bowels, no vomiting and no pain.

Examination showed the little patient to be moderately emaciated and quite pale, but bright and playful and evidently not suffering. The right side of the abdomen was found greatly distended by a large, hard irregular mass, with numerous dilated veins coursing over it. By palpation, this mass was found to extend as low as the crest of the ilium and one inch to the left of the median line at the navel. Its surface was irregular. At its lower pole a nodule was found, the size of a plum, soft and cystic. The consistence of the rest of the mass varied, so that at certain spots it was soft and elastic, though in the main very hard. The fingers could be inserted easily beneath its lower pole, above Poupart's ligament; while at its upper end deep pressure showed a distinct intermission between the mass and the lower edge of the liver. The left border was irregular, but free, and could be mapped out easily by the examining fingers; while the right border extended deeply into the loin and toward the back and could be palpated bimanually clear through from abdomen to back. There was no tenderness, even on vigorous manipulation. On top of the tumor, running from below upward, just to the right side of the navel, lay what was evidently bowel, as determined by the tympanitic percussion note elicited over it and by the gurgling sensation on palpation. This was considered to be the displaced ascending colon and gave a valuable clue to diagnosis.

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* Read before the San Francisco County Medical Society, December, 1906.

All other investigation was negative. The blood showed a moderate secondary anemia. The urine was clear, contained no blood, and the mother said it had never been bloody in appearance. The feces were normal in color and consistence. There was no leukocytosis and no fever.

For reasons that will be discussed later, a diagnosis was made of sarcoma of the kidney. The case was referred to Dr. George B. Somers for operation and the tumor was removed by him on June 27th. The entire mass was referred to the laboratory of Dr. William Ophüls for pathological examination, and the following report was in due time returned: "The tumor measures 14 cm. x 12 cm. x 9 cm. It consists of kidney completely surrounded by an irregular fibrous capsule. Cut section shows a small part of the kidney still intact, while the rest of the growth consists of an irregular cystic mass with many necrotic areas. Microscopic section of the kidney tissue shows a very marked chronic interstitial nephritis, with the entire cortex and medulla close under the capsule. Toward the center of the growth, in the tumor proper, is found a cellular tissue consisting principally of large spindle cells; in places are found large round cells with mitoses; some of the spindle cells show delicate fibrillæ of connective tissue. Diagnosis: Spindle-cell sarcoma, probably originating in pelvis of kidney."

Following the operation, the patient recovered without incident and left the hospital on June 11th. He remained well and was not seen again until September 17th. Then his mother brought him back for examination, because a week or ten days before she had again discovered a lump in the child's right side. He appeared in good health, but examination showed a large nodular mass at the site of the former operation. After consultation with Dr. Somers and Dr. Stanley Stillman, it was decided that the growth was not now an operable one and the child was sent back to his home in Porterville. On December 4th, Dr.

Hardeman reported to me that the baby was still alive, but was much emaciated, the growth much larger than at the first operation; nearly all food was being vomited, but he seemed to suffer no pain. He died on December 20th.

Three questions in particular have presented themselves to me in the study of this case. *First,* how frequent is sarcoma of the kidney in infancy? It certainly is a rare occurrence, as all authorities agree. I have looked over the records of 2,260 cases of disease in infants and young children (all under twelve) seen in the Children's Clinic at Cooper Medical College during the past ten years and find that there has been no case of sarcoma of the kidney among them. My own experience in private practice coincides with this, for I had never met with a case before this one presented itself.

The *second* question is this: How are we to know so rare a disease when we meet it? As a matter of fact, all abdominal tumors are rare in infancy; but when one is found like that just described—occupying one side of the abdomen, of rapid growth, causing little disturbance of general health, causing little or no pain, the probabilities are always in favor of sarcoma of the kidney. The other possibilities are few and usually can be eliminated if sufficient care is taken. Twice I have seen hydatid cyst of the liver in young children, forming a tumor on the right side; but in each case it was clear that the tumor originated from the liver and not the kidney. Once I have seen in a young child an enormous tumor of the spleen occupying the left side of the abdomen, but the outline of the mass and its notched lower edge, together with the clinical history of hematemesis, the presence of ascites and an exceedingly low hemoglobin reading, made the diagnosis of splenic anemia a definite one. Other conditions of the kidney itself, leading at times to the formation of a tumor in the infant's abdomen, are hydronephrosis and pyonephrosis; but their history, consistence and effects are entirely different from those of sarcoma of the kidney.

The manifestations produced by sarcoma of the kidney in infants, that serve to identify it, are singularly few. All authorities agree that its growth is rapid, that it does not produce cachexia until it is very large, that it causes little or no pain or disturbance of general health, and usually is first discovered by accident, because of a change in abdominal contour. Hematuria is stated to be a diagnostic symptom, but this case certainly did not show it. Furthermore, if tumor is not present, hematuria in infancy is more likely to mean acute nephritis or to be one of the manifestations of scurvy.

We come to depend, therefore, on the examination of the tumor itself and of its relation to surrounding parts, as our most important aid to diagnosis. Here the points to be depended upon are these: *First,* tumors of the kidney lie behind the colon, while tumors of the liver or spleen lie in front of it; *second,* a tumor of the kidney begins at one side, but grows both downward and inward, toward the median line, while other abdominal tumors in infants, such as those arising from retroperitoneal lymph nodes, are more centrally situated from the outset; *third,* sarcoma of the kidney is hard and firm and fixed, while congenital cystic kidney, hydronephrosis and pyonephrosis are all movable and fluctuating.

Finally, the *third* question, that must always present itself when once the diagnosis is made, is this: Is operation justifiable? Upon this point surgical authorities do not agree. The immediate mortality from the operation is so high, and recurrence, even after successful operation, is such a common event, that many look upon surgical interference as unwarranted. But, on the other hand, all other treatment is absolutely unavailing and surgery alone offers the slightest prospect of success. In spite, therefore, of the unfortunate recurrence in the case reported, I should not hesitate to advise the same plan of procedure in a similar case as that pursued in this.

Shreve Building.

REMOVAL OF CERUMEN FROM THE EXTERNAL AUDITORY CANAL.—Austin L. Badcock, of Brighton, England, recommends a method he has lately adopted as a preliminary to syringing in the removal of accumulations of cerumen in the external auditory canal. With the head on one side and the external auditory meatus looking directly upward, he inserts an ear speculum, and through it pours 6 or 8 drops of ether. This is allowed to remain about a minute, at the end of which time the softened wax is easily removed by the syringe. The presence of cerumen should always be determined before dropping in the ether, as it is liable to cause pain if it falls directly on the tympanic membrane.—*The Lancet.*

THE PATHOLOGY OF TUBERCULOSIS IN CHILDREN.*

BY JOHN McCRAE, M.B. (TOR.), M.R.C.P. (LOND.),
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When one deals with the pathology of tuberculosis in children one meets many conflicting statements and ventures at once on controversial ground. What I bring forward I bring in no controversial spirit, and as time does not allow the presentation of argument I shall try to state what seem to me to be safe conclusions.

I have some hesitation, too, in bringing before you observations that have come from your own midst, but their importance is my excuse. The first year of life is comparatively free from tuberculosis, although Schwer found 14 per cent. of his series of autopsies between the second and twelfth months tuberculous. The first three hemidecades are all liable; the second being perhaps most so, although Müller's figures are greatly in favor of the first. It is deplorably frequent. Of 11,000 indoor patients in hospitals in cities of England, Scotland and Ireland 25 per cent. were tuberculous; roughly, half of these are being treated in the surgical wards. Without accurate figures, I fear that our hospital statistics are fully two-thirds as bad.

In children up to fifteen years of age there are several groups of cases to be considered: First, the small class, who in early infancy have intestinal tuberculosis from ingestion. Second, those of any age who store up the germs for a longer or shorter time, and finally suffer from an infection which is generalized. This shows itself in a variety of different forms—bone and joint tuberculosis, lymphatic tuberculosis, and so on, and is apt to end by meningeal tuberculosis or tuberculous bronchopneumonia, which should often be called simple bronchopneumonia in a tuberculous lung. Third, those few older children who develop phthisis.

Much interest centers about the primary intestinal tuberculosis of young children. Some English pathologists give a considerable frequency for this. I think every one in this country will concur in the reasonableness of Dr. Bovaird's 2 in 125 cases, and Drs. Holt and Northrup's 1.3 per cent.

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* Read before the Section on Pediatrics, New York Academy of Medicine, January 2, 1908.

This form of infection brings us at once to the question of the varieties of tubercle bacilli, and their effectiveness.

Tubercle bacilli, originally, were probably all of one kind; by lapse of time and difference of environment, strains have been developed, so that we now have human, bovine, avian, piscine and reptilian forms, cousins to one another; each of these, as a rule, is weakly pathogenic for races other than its own host-race, save for those animals that are particularly susceptible to any form of tuberculosis. An avian, for example, can become pathogenic for animals by repeated passing through animals, and so on; this process probably takes a long time in the case of the bovine and the human, whose cousinship at the present moment is not a very close one. We may dismiss here the avian, reptilian and piscine types. It is probably the case that the average human being can overcome an infection of bovine bacilli more easily than that of human bacilli; nevertheless, it is certain that a number of bovine infections occur.* It is not my intention to carry this distinction of bacilli through what I have to say, but I must point out that there is a type of infection in children which we call "bovine," viz., a slowly-progressive tuberculosis, tending to much overgrowth, and to dry caseation which affects mainly lymph nodes anywhere in the body. To-day we can, at times, isolate from such foci bacilli that have the distinctive cultural characteristics of the bovine form, and the bovine grade of virulence toward animals of the laboratory.

Children are liable to infection by air-borne bacilli of the human, less frequently of the bovine, type. They can ingest human bacilli picked up from the floor or from food carelessly exposed in infected rooms, and are liable to infection by ingestion of bovine bacilli from milk and other forms of food of which milk is a component part. We need discuss only the latter infection. Milk and butter are likely to contain the tubercle bacillus, if the cows giving the milk have tuberculosis of the udder, and may contain it even if udder disease be not present. The bacilli in the milk supply depend then on the number of infected animals in the environs. European figures, collected in Lubarsch and

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* The statement that bovine tuberculosis is less virulent than human tuberculosis for human beings rests upon the fact that the cases so observed have generally been of the lymphoid form or from cases of slow progression; to the contrary must be stated the observation that apes are more virulently attacked by bovine than by human tuberculosis.

Ostertag, show that of 396 milk examinations 9 per cent. contained bacilli, and of 244 butter examinations bacilli were found in 8.3 per cent.; this is probably a greater percentage than exists in the United States or Canada. Some people drink such milk with impunity, but weakly children, and those whose diet consists largely or wholly of milk, are apt to be infected. Perhaps half of the children so infected show lesions which by the naked eye are not to be distinguished from the lesions of human bacilli. A certain number, on the other hand, show a glandular type of the disease, where large, dry caseations are found and the tissue overgrowth leads one to suppose that the lesion was caused by bovine bacilli, because of the resemblance of the reaction to the changes seen in cattle-tissue.

The exact cultural studies made in Germany, the United States and England upon the bacilli isolated from cases of tuberculosis, indicate that of children under five years of age affected by tuberculosis four-fifths were probably infected by air-borne human bacilli. One-fifth may show the "bovine" form, and this percentage decreases greatly as the age progresses. Once infected, by whatever form, the further course of the bacilli in the lymphatics of the body is interesting, but obscure, in spite of the wide experimentation of Bartel and others. He who dogmatizes least as to what lymph nodes are primary and what secondary, is most likely to be least in error; and, finally, we probably must admit that bacilli can pass through tissues and glands without leaving traces visible to the eye (Chauveau), and can remain in tissues for considerable time without exciting even lesions so slight as to be recognizable only by the microscope. Such a condition probably ought not to be called a tuberculosis of the organ concerned. When infection occurs in children, the first site in air-borne infections is some part of the lymphoid tissue of the upper air-passages or the lungs, and, in intestinal infections, the mesenteric nodes. Is it possible to fix definitely the primary seat of infection as intestinal? If the mesenteric nodes show caseous or calcareo-caseous change more marked than the thoracic, or if there be ulceration of the bowel or tubercles of the mucosa without cavitation of the lungs, or if the bovine form be isolated from the lesions, all these in artificially-fed children suggest intestinal infection. While familiar with the arguments of Behring and other upholders of milk-borne infection, I think that advanced thoracic lesions should be allowed to weigh in favor of infection by the respiratory channels. One must also admit that tubercle bacilli from milk may stick to the fauces and gain a foothold on the thoracic lymphatics; but, on the other hand, respired bacilli may go down with food or with saliva, so in that regard honors are almost even.

A digression may be here permissible to point out my personal experience in a special class of infants—foundlings. These segregated children, artificially fed on milk that is pasteurized, are practically free from tuberculosis. In 747 autopsies, of whom 60 per cent. were three months of age or less, tuberculosis was found but five times (.66 per cent.). Of the five, one was three months, two five months, one fourteen months, and one was a baby of ten days, with tuberculous mesenteric glands and tuberculous ulcers of the ileum and cecum. This case came direct from the Maternity Hospital to the service of Dr. Klotz. In the first 4 cases the evidence was in favor of the thoracic mode of entrance, and the last must have been infected by swallowing infected amniotic fluid, although I examined the mother and could find no evidence of tuberculosis in her. Where, then, are our infections by milk? I do not know. I do know that these children are of low vitality; that pasteurized milk may well contain bacilli, attenuated but not dead; that the Province of Quebec has a fair amount of bovine tuberculosis, and that three months of life is sufficient time to allow an infection to take good hold. There must surely be less intestinal tuberculosis of infants than we have sometimes been urged to think.

We have always supposed that children fed on food free from tubercle bacilli, and free from direct maternal infection in the first months of their life, will show no mortality from tuberculosis such as European figures show. What then is to be made of Kitasato's findings that in Japan, where bovine tuberculosis is non-existent, and where children are not even milk-fed, as a general thing, infantile tuberculosis is yet very frequent? Perhaps the truth is that we have laid too great stress upon milk-borne tuberculosis where the bovine disease is prevalent, and have forgotten that children are more liable to the human form than adults, in that if they do become exposed to a house or other local infection, they spend less time away from their dangerous surroundings than do their adult relations.

In speaking of the other forms of tuberculosis, why in certain cases does the disease manifest itself in bone and joint and remain there? I feel sure this phenomenon is some expression of the sum total of lowered bacterial virulence and heightened resistance of an individual tissue. I do not feel prepared to accept that such infections are necessarily bovine, as has been suggested, because I feel sure that the individual resistance is a greater factor than the bacterial variation of virulence in producing those cases of apparently atypical course. Of the lymphatic form, I would gladly speak, if I knew anything about it to say. There certainly are many cases of tuberculosis in children that one sees where the lymph nodes seem to be the main seat of disease, and it has sometimes struck me as possible that, when we speak of "scrofulous diatheses," etc., and malign the resisting powers of such a child, we may make a mistake; the concentration of disease in lymph nodes may be but a mark of the tremendous fight the lymphoid tissue is making, and perhaps the universally tuberculous nodes are but another expression for a generalized miliary tuberculosis, but one that has been countered by a better resistance on the part of the child. It is true that by the time the autopsy table is reached the end result is usually the same, but the widespread miliary condition may have been long postponed by this same "tendency to enlarged glands."

Meningeal tuberculosis is a very important subject, and a very frequent form, but I wish to show in what a large percentage of cases it is merely a local evidence of a generalized tuberculosis. It occurs either as secondary to a bronchial or other gland infection without there being disease elsewhere, or as a local manifestation of the disease that exists in many other organs. The latter is the more frequent.

Let me illustrate by our Royal Victoria Hospital series of such cases, of which the majority are in children of fifteen years or less, but which nevertheless comprises some adults. The appropriateness of the illustration is not lessened by this. In 1,000 autopsies we had 29 cases of tuberculous meningitis with complete autopsy; 21 of these had a generalized tuberculosis of many organs. Two others had tuberculous foci elsewhere in the body, of a lesser degree of extension, but active. Thus nearly 80 per cent. of our cases of tuberculous meningitis had a hopeless extension of the disease elsewhere. If these figures are to be trusted, the chances are 4 to 1 against any successful surgical procedure being possible in a given case.

Of generalized tuberculosis, my experience has been that the most frequent site of involvement is the lung, which was affected in 95 per cent. In more than half the cases the following organs are affected, in the stated order of frequency: Lymph nodes, spleen, liver, intestines, meninges and kidneys. Tuberculoma in the brain was about one-fourth as frequent as meningeal involvement in our series.

Finally, the question yet remains obscure, as to how the bacteria actually pass the surface of pharynx, bronchus or intestine. Few observers believe that a lesion is necessary. Doubtless some bacteria adhere to fat droplets and are engulfed by unobservant phagocytes; probably small growing colonies on the surface can exert an eroding action on the mucosa by their toxins. It is worth considering if the youthful mononuclears, exalted in numbers as they are in childhood, are more avid to take up tubercle bacilli than their more fastidious successors.

(Discussion on page 313.)

PARATHYROID GLANDULES IN PRIMARY INFANTILE ATROPHY. —R. L. Thompson (*American Journal of the Medical Sciences,* October, 1907) reports a close research on the condition of the parathyroid in a case of primary infantile atrophy, and states that in primary infantile atrophy the parathyroid glandules show changes which may be degenerative in type, but which are, for the most part, progressive, and consist in replacement of a varying amount of the gland parenchyma by connective-tissue stroma. These changes are similar in nature to those which are constantly present in the thymus gland in this disease. Moreover, these progressive changes are present in other ductless glands, and become especially apparent in long-standing cases of the disease, as evidenced in the extreme atrophy of the thyroid and medullary suprarenal in the cases described. The author does not imply that these various glands are primarily at fault in infantile atrophy, but rather emphasizes the fact that failures of assimilation in this disease lead to wider changes than simple wasting of fat and muscle. The fatal result in this disease is more easily understood when the physician realizes the constant involvement of structures that elaborate substances which are essential to health, or even life itself, as are here found.—*Monthly Cyclopedia of Practical Medicine.*

LABORATORY AIDS TO THE DIAGNOSIS OF TUBERCULOSIS IN INFANTS AND CHILDREN.*

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Tuberculous processes in various parts of the body may often be recognized by bacteriological or microscopical examination of the secretions or tissues of the parts involved. Tuberculous affections in children often run an obscure course, and the diagnosis is therefore difficult. In this paper an attempt is made to emphasize those aids to diagnosis which are found in the clinical laboratory. The demonstration of the tubercle bacillus in body fluids or secretions is diagnostic, but in some cases the laboratory findings must be considered only in the light of an important symptom and with the general clinical picture. The subject will be considered in relation to the examination of the blood, urine, sputum, feces, body fluids, discharges, tissues, etc.

Examination of the Blood.—Microscopical examination of the blood in various forms of tuberculosis in children shows nothing characteristic. There is usually a mild secondary anemia without leukocytosis or leukopenia. There may be a leukocytosis if a secondary infection is present. With the clinical picture of marked wasting without apparent cause, associated with anemia of moderate degree, the diagnosis of tuberculosis may often be made. A blood examination may be of value in differentiating tuberculosis from malaria or typhoid fever; in the former the protozoa are found in the erythrocytes, and in the latter a Widal test should be made. The blood count may aid in excluding empyema or pneumonia from tuberculous pleurisy. Tuberculous meningitis is generally free from leukocytosis, while other forms of meningitis are accompanied by a high leukocyte count; the same is true of peritonitis or pericarditis.

Tubercle bacilli *have been* demonstrated in the blood, but they occur in such small numbers that for diagnostic purposes blood cultures or animal inoculation must be made. The difficulties attending the growth of tubercle bacilli on artificial media make blood cultures impracticable.

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* Read before Section on Pediatrics, New York Academy of Medicine, January 2, 1908.

Examination of the Urine.—In tuberculous affections of the genito-urinary tract, tubercle bacilli can usually be found. The bloody or bloody-purulent sediment (in acid urine) in urogenital tuberculosis contains shred-like or rounded, somewhat ragged flocculi, pinhead in size, which upon microscopical examination show pus cells and fatty detritus. If smears are made and stained, tubercle bacilli are found as dense collections among these cells.* In examining urine for tubercle bacilli, confusion with smegma bacilli must be avoided. To exclude the presence of the latter, the preputial folds of the penis or clitoris should be thoroughly cleansed, and the urine drawn by catheter. Bunge and Trautenroth claim that by this method the urine is always free from the smegma bacillus.

It is stated by some authors† that tubercle bacilli may be found in the urine when the tuberculous process is elsewhere than in the urogenital tract; in such cases, however, they occur in such small numbers that their demonstration is not practicable.

To differentiate the tubercle from the smegma bacillus, the following methods have been found satisfactory: Stain in the ordinary manner with carbolfuchsin, wash in water, place the slide in a strong alcoholic solution of methylene blue, without acid. Leave for thirty minutes. Or, after staining with carbolfuchsin, the slide is decolorized in 5 per cent. solution of sulphuric acid for three to five minutes, then in absolute alcohol for fifteen to thirty minutes, and stained with ordinary methylene blue. By these methods the tubercle bacilli are stained red, all other organisms blue. The smegma bacillus, but not the tubercle bacillus, is decolorized by the Gram stain.

Examination of the Sputum.—Pulmonary tuberculosis in young children is often accompanied with little or no sputum; it is usually swallowed. To obtain sputum from these cases the method of Findlay,‡ the stomach tube, inversion of the child during coughing or expectorant mixtures may be employed.

Holt,§ in 67 cases of pulmonary tuberculosis in children under two years, made the diagnosis by examination of the sputum in 80 per cent. of the cases, when, according to the physical signs, the disease was not far advanced. Examination of bloody mucus from the sputum of older children often reveals the tubercle bacillus. In acute miliary tuberculosis there may be no sputum.

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* Lenhartz-Brooks. Clinical Microscopy and Chemistry, 1905, p. 344.

† Pfaundler u. Schlossman. Handbuch der Kinderheilkunde, 1906.

‡ Findlay, of Glasgow, recommends that the finger be covered with a piece of gauze; the larynx and epiglottis are then irritated to induce coughing, any sputum being swept out of the throat before it can be swallowed.

§ Holt, ARCHIVES OF PEDIATRICS, September, 1907.

Examination of the Body Fluids.—The diagnostic value of the number and character of the cellular elements in exudates and transudates has been emphasized in recent years. Polymorphonuclear leukocytes have always been considered as evidence of recent inflammation of some severity. Mononuclear cells are indicative of a milder or later stage of inflammation, since they are evidently the result of regenerative processes consecutive to inflammation, originating in the lymphoid tissue found in almost all viscera. This explains the presence of large numbers of mononuclears in tuberculous exudates, for the process is usually insidious in development and accompanied by slight inflammation.

In tuberculosis of the cerebrospinal canal, the pleura, pericardium, and the abdominal cavity, the mononuclear cells do not always predominate in the fluid, for in cases known to be tuberculous the polymorphonuclears have been shown to be most numerous at an early stage of the process; later, however, the mononuclears predominate. Therefore, the predominating type of cell is more indicative of the stage and severity of the disease than of the etiology.

The cerebrospinal fluid in tuberculous meningitis is usually clear and, upon examination of the sediment obtained by centrifugation, the mononuclears predominate. Tubercle bacilli are found in the fluid in 50 per cent. of the cases.* The last portion of the fluid withdrawn by lumbar puncture contains most bacilli, and they are found most frequently if the puncture is made in the early stages of the disease. The fluid may be allowed to stand for ten or twelve hours, or it may be centrifuged thoroughly, the coagulum forming at the bottom of the tube being examined for the bacilli. Holt,† in 42 cases, found bacilli in the fluid of every case, and it may be assumed that the bacilli are always present, as has been shown by animal inoculation.

In making microscopical examination of the coagulum in other forms of meningitis, it will be noted that the organisms (pneumococcus, diplococcus, intracellularis, etc.) are found in or among the polymorphonuclear cells. The fluid in these forms of meningitis is usually cloudy, due to the presence of polymorphonuclear leukocytes.

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* Rous. American Journal of the Medical Sciences, Vol. VII., 1907.

† Holt. ARCHIVES OF PEDIATRICS, September, 1907.

Pleurisy with effusion, pericarditis, and sometimes peritonitis, can be diagnosticated as tuberculous by examining the fluid withdrawn from the respective serous cavities. The bacilli are demonstrated in the same manner as in the cerebrospinal fluid, and the mononuclear cells often predominate.

Examination of the Feces.—Children with pulmonary tuberculosis often swallow sputum containing tubercle bacilli, and examination of the feces in these cases frequently reveals the presence of these organisms. Cruchet and Lepage* state that examination of the feces in young children is of great value and should repeatedly be made.

Tuberculosis of the intestine, associated with diarrhea, with blood and mucus in the stools, can often be diagnosticated by a careful examination of the stool for tubercle bacilli. The number of bacilli, in relation to the mass of the feces, is small, but if those portions of the stool containing blood and mucus are examined, the organisms are usually found. To exclude the smegma bacillus, which at times may be found in the stool, the method of differential staining referred to above may be used. Rosenberger† claims that tubercle bacilli are found in the feces with the greatest ease, and he reports cases of ascites of obscure origin, miliary tuberculosis, meningitis, glandular tuberculosis, hip-joint disease, and Pott's disease of the spine, in which the bacilli were found in the feces and the diagnosis thus made. Other workers do not claim so much for this method of diagnosis of tuberculous processes in various parts of the body, and Rosenberger's claims need confirmation.

Examination of Tissues.—Various tissues of the body involved in a tuberculous process may be diagnosticated as such by examination of sections of hardened tissue. Lymph nodes, tuberculous affections of the skin or mucous membranes are easily recognized as tuberculous from the characteristic appearances of coagulation necrosis and, usually, giant cells. By such examinations a differential diagnosis from Hodgkin's disease may be made.

Examination of Secretions and Discharges.—Tuberculous affections of the eye, ear, nose, throat, urethra and vagina in children may often be differentiated from lesions due to other microorganisms by microscopical examinations of the secretions from these sources. Volkmann has described cases of tuberculosis of the tongue, nasal mucous membrane and throat, in which the diagnosis was made by examining the scrapings or secretions for tubercle bacilli.

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* Cruchet and Lepage. Rev. des maladies d. l'enfants, December, 1905, p. 544.

† Rosenberger. American Journal of the Medical Sciences, December, 1907.

The Opsonic Index as a Diagnostic Aid.—Numerous recent writers consider the estimation of the tuberculo-opsonic index of value in the diagnosis of obscure tuberculosis. In localized tuberculosis the index is usually found to be low, but if there is a mixed infection, or if the process is acute, the index may fluctuate as a result of autoinoculation.* The difficult and tedious technique of estimating the opsonic index, and the wide variations obtained by various observers, make this procedure impracticable for diagnosis.

Muller† claims to have found a quick method for the diagnosis of tuberculous pus by means of Millon's reagent, but admits that the method is not always diagnostic.

(Discussion on page 313.)

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* Ogilvy and Coffin. Journal of American Medical Association, January 11, 1908.

† Muller. Centralbl. f. in. Med., No. 12, 1906.

EFFECTS OF GONORRHEA ON CHILD.—Lobenstine and Harrar (*Bulletin of the Lying-In Hospital of the City of New York*, December, 1906) studied 250 breast-fed infants during the first ten days of life. In 50 of the mothers the gonococcus was demonstrated in the genital tract. The findings are summarized as follows: (1) The average birth weight of babies of gonorrheal mothers is less than that of babies of normal mothers. (2) The average initial loss is more pronounced in the gonorrheal babies (5.82 per cent. as against 4.74 per cent.). (3) The amount of loss regained on the tenth day is only 10.9 per cent. in the gonorrheal babies, as against 49.3 per cent. in the normal babies. (4) The gonorrheal babies show both more temperature disturbance and more intestinal disturbance than normal babies. (5) The babies of non-gonorrheal febrile mothers show a greater average initial loss than the normal babies, and do not regain at the time of discharge but 5.3 per cent. of their loss, as against 49 per cent. in normal babies.—*Journal of American Medical Association.*

CHANNELS OF COMMUNICATION IN TUBERCULOSIS: THEIR RELATIVE SIGNIFICANCE.*

BY S. McC. HAMILL, M.D.,
Philadelphia.

The question of the modes of introduction of the tubercle bacillus into the human body remains at the present time entirely unsettled, more unsettled, in fact, than it was a few years ago, when we accepted it as proven, on the basis of postmortem evidence, that infection by inhalation was the chief, if not the only, channel.

Infection by ingestion was receiving some consideration prior to the time that Koch, in 1901, excited the investigating public by making a somewhat premature statement regarding the relationship of the bovine bacillus to human tuberculosis. This announcement, however, stimulated research until now we have an abundant literature from which it would seem possible to prove almost any theory and, with equal satisfaction, to disprove them all.

The avenues by which the tubercle bacillus gets into the human body are: The maternal circulation (congenital tuberculosis); the skin; the ear; the conjunctiva; the urogenital tract; the respiratory and intestinal tracts. It has been advocated by Baumgarten and his pupils that the majority of cases of tuberculosis are of congenital origin.

For them it does not follow that tuberculosis need manifest itself within the first few weeks of life in order to establish its congenital origin, because they believe, of prenatal infections, what Von Behring does of postnatal infections, that when the tubercle bacillus is once introduced into the body it may remain alive and virulent for an indefinite period before infecting the organism.

There are still others, as Warthin and Harbitz, who consider congenital tuberculosis of more frequent occurrence than is generally accepted, whilst the vast majority admit the proof of its existence but look upon it as uncommon. There is considerable evidence to confirm this latter view. In the first place, aborted fetuses or stillborn children of tuberculous women rarely show the lesions of tuberculosis. In many instances, even the inoculation of guinea pigs with the tissues of fetuses born of women the subjects of advanced tuberculosis, and in whom the placentæ were tuberculous, have failed to produce tuberculous lesions.

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* Read before the Section on Pediatrics, New York Academy of Medicine, January 2, 1908.

Furthermore, numerous postmortem investigations of infants born of tuberculous mothers and dying within the first few weeks of life have shown no macroscopic evidences of tuberculosis, and their lymphatic glands when inoculated into animals have failed to produce tuberculous lesions.

On the other hand, the advanced lesions of tuberculosis in infants dying within two or three weeks of birth are often very difficult to explain on the basis of postnatal infection, although there are instances recorded in which tuberculosis occurred within this period in infants born of nontuberculous parents without histories of exposure. It would seem safe to assume that these were cases of postnatal infection.

The evidence at hand, therefore, leads us to believe that fetal infection, as compared with the other forms, is exceedingly rare.

INFECTION THROUGH THE SKIN.

The frequency with which the tubercle bacillus finds entrance to the human body through the skin is extremely difficult to determine, but it is generally supposed that this manner of infection is uncommon. Clinically, we not infrequently see localized lesions of the skin and occasionally instances in which the evidence is strongly suggestive of generalized infection from the local lesion. Experimentally, it has been proven by Cornet that inunctions of sputum over the skin of the cheek, nose, etc., will produce not only local lesions but involvement of the cervical glands, the bronchial glands and later of the lungs, liver and spleen. It is admitted by many, also, that the tubercle bacillus may pass through the skin without leaving any traces, and in like manner pass the regional lymph glands to produce lesions of the more remotely situated organs.

The other avenues of what may be termed *"external infection"*—the conjunctivæ, the ears, and the urogenital tract—are less frequent, but well established.

In the vast majority of tuberculous subjects, infection occurs either through the respiratory or alimentary tracts, and it is regarding the relative frequency of these two modes of infection that there exists such wide difference of opinion.

The term "respiratory infection" is used to define the introduction of the tubercle bacillus, through the medium of inspired air, into the smaller divisions of the bronchial tree or into the alveoli of the lungs, where they either produce lesions or are taken up by the lymphatic vessels and conveyed to the bronchial glands, where they may be held in check permanently with the production of tubercles, or be conveyed secondarily to the lungs through the blood or lymph channels to produce the lesions of pulmonary tuberculosis. (Lower respiratory tract.) It further covers the introduction by inspiration of the tubercle bacillus into the mouth, fauces, nares, nasopharynx or pharynx, and their lodgment on the mucous membranes, the tonsils and the lymphoid tissues of the pharynx and nasopharynx. (Upper respiratory tract.)

All of these latter areas, save the nares, may be included also in the upper digestive tract, and may have the tubercle bacillus conveyed to them by food, by kissing, or by the introduction into the mouth of fingers or utensils which have been in contact with particles of tuberculous sputum.

Any of the remaining portions of the digestive tract, classified as the lower digestive tract, may be the seat of tuberculous lesions, but, as avenues of entrance for the specific organisms, the intestines, especially the ileum, ileocecal valve and appendix are the most frequented, and when infection by the lower alimentary tract is referred to, it is generally understood that the intestinal tract is indicated.

The conclusions which have been reached regarding the relative frequency of the various channels of infection have been based upon clinical and pathological data and the results of animal experimentation. The value of the former has been very much reduced, if not destroyed, by the results of the latter. We can no longer accept the oldest lesion as indicating the point of origin of the process, because it has been clearly proven, and universally accepted, that the tubercle bacillus can pass through the skin, the tonsils and the intact mucous membranes of the intestinal tract to the regional lymph glands without producing lesions at the point of entry.

It has been still further shown by the experiments of Valleé, Calmette and Guerin, that tubercle bacilli may be introduced into the esophagus by a bougie, thus preventing the possibility of infection by inhalation, and thus introduced can pass through the intestinal mucosa and the adjacent lymphatic glands, and, without leaving any macroscopic or microscopic evidence of their course, pass on to the bronchial lymph nodes and there produce the first macroscopic evidences of infection. Orth and Weichselbaum hold this view, and Bartel, from the results of his experiments, believes that the mesenteric glands may not only fail to show macroscopic or microscopic evidences of infection, but eventually either destroy or so reduce the virulence of retained bacilli that it is even impossible to produce tuberculosis in animals inoculated with these mesenteric glands. In other words, a tracheobronchial gland tuberculosis with secondary pulmonary tuberculosis may occur by way of the intestinal tract and mesenteric glands without even leaving any inoculation evidences of infection in the channel of entry. Even Cornet, who admits that the tubercle bacillus may transverse the mucous membrane without producing lesions at the point of entry, practically acknowledges also that the regional glands may likewise escape when he says: "The next succeeding lymph glands *cannot, as a rule,* be passed over without the production of some typical pathological changes, even though these be slight in character."

It has been proven further by Aufrecht and others, and acknowledged by Orth, Weichselbaum, and many others, that, with or without tonsillar tuberculosis, tubercles may be found in the lymphatic gland chain from the neck to the mediastinum, with the most advanced lesions in the latter group, and without evidences of tuberculosis in the lungs.

Clinically, also, we know that tuberculous cervical adenitis sometimes disappears, although the subject may succumb later to generalized tuberculosis with advanced lesions in the bronchial glands.

In the light of these facts, therefore, it is manifest that we cannot safely determine the portals of entry of the tubercle bacillus from the appearance of the lesions found at the autopsy. We are compelled, therefore, to turn to the results of animal experimentation.

RESPIRATORY INFECTION.

Let us first consider what light such experimentation has thrown upon the respiratory origin of tuberculosis. Infection through the nose and the lymphatic tissues of the nasopharynx is generally admitted. Microscopic studies of the pharyngeal tonsils have shown the frequent existence of tuberculosis, according to some authors, but those who have systematically injected the tissues into animals have found the percentage of positive results very small, from which they argue that infection through these tissues is not nearly as frequent as was formerly believed.

As to infection by the lower respiratory tract—the lungs—much experimental work has been done.

The experiments of Cornet, in which he produced bronchial gland and lung tuberculosis without intestinal lesions, by exposing guinea pigs to an atmosphere containing dried sputum in the form of dust; those of Hartel and Herrman, in which, by exposing guinea pigs to an atmosphere containing the bacterium prodigiosum in the form of atomized emulsion, they recovered a small proportion of the microorganisms in the peripheral portions of the lungs; the results of similar experiments with the human bacillus in the hands of Bartel and Neuman, in which they caused both respiratory and alimentary infection; the inhalation experiments of Kovac by which he demonstrated the tubercle bacillus in the lungs, in most instances in small quantity and sometimes not at all; the constant success of Findel in the production of bronchial gland and lung tuberculosis by inhalation in tracheotomized and non-tracheotomized animals; and the results of Pfeiffer and Friedeberge's inhalation experiments on guinea pigs with diluted cultures of tubercle bacilli, in which they induced pulmonary and bronchial gland tuberculosis in most of their cases, make it very evident that the tubercle bacillus may enter the human body through the medium of the lower respiratory tract and induce local lesions in the lungs and bronchial glands.

Flügge's experiments, bearing on inhalation tuberculosis, which were reported to the recent Vienna Conference, were very favorably received. He produced pulmonary tuberculosis by inhalation in guinea pigs, rabbits, goats, calves and dogs by means of a very small number of tubercle bacilli; in guinea pigs with less than 50. The bacilli were floated in the air in the shape of droplets.

He concludes from these experiments:—

(1) That inhalation represents a mode of infection as efficacious as subcutaneous injection, with regard to the very small dose required; and that inhalation infection produces a disease more rapid in course than does subcutaneous injection.

(2) That it may be accepted as proven by the inoculation of the peripheral parts of the lung into guinea pigs, immediately after exposure to an atmosphere containing droplets, that at least some of the bacilli inhaled with the air in the shape of droplets are carried to the finest bronchi.

(3) That the number of bacilli required to produce manifest symptoms of the disease, when ingested with the food, is millions of times larger than when infection is by inhalation, and the fatal termination takes place at a much later period. He accepts it as proven, therefore, that inhaled tubercle bacilli are capable of producing tuberculosis directly, and not, as some authorities assert, because some of them are swallowed and penetrate into the body from the intestines or throat.

He considers the droplets containing bacilli, which are coughed out by tuberculous patients and mixed with the immediately surrounding atmosphere, more dangerous than dust containing bacilli, since very fine particles of dust, capable of flying about in the air, are rarely formed from the sputum. These observations by Flügge require confirmation. While I have had access only to his own statement of his conclusions, and not to his original article, it is not shown in this that his methods were materially different from those adopted by Findel and himself in former experiments.

The number of bacilli required to produce infection in this series of experiments is much less than the number required in the earlier experiments of Flügge and Findel. The difference in their results cannot be attributed to the use of animals which were particularly susceptible, for they used a large variety, but it does suggest that they may have been working with a particularly virulent organism.

ALIMENTARY INFECTION.

These results are directly contradictory to the results of Bartel and Spieler, who, in order to test the effects of exposure to the tubercle bacillus under natural conditions, conducted the following experiments: They placed some non-tuberculous guinea pigs in tuberculous households and permitted them to remain there for six days. At the end of this time they had developed no disease of the lungs, which proved that the animals had not inhaled the small quantity of tubercle bacilli into the lungs that, according to Flügge and Findel, is necessary for the production of inhalation tuberculosis, whilst, on the other hand, large numbers of tubercle bacilli must have entered the digestive tract, since the animals already had alimentary tuberculosis when they were returned to the laboratory.

As Weichselbaum has pointed out, in applying these results to man, we may assume that, in childhood at least, large quantities of tubercle bacilli often get into the digestive tract, but, on account of the greater resistance of man, produce no tuberculosis, or at least no manifest tuberculosis. Nevertheless, the bronchial glands and lungs may become infected secondarily and produce a rapidly progressive tuberculosis.

The claim of Flügge that the floating of bacilli-infected droplets in the air is more dangerous than bacilli-laden dust, is not in accordance with the results of other investigators, and, as Walsh of Philadelphia has pointed out, this view is directly opposed to clinical experience. It would make living with a tuberculous patient dangerous, not so much from the particles of dried sputum attached to a dirty patient, as from the droplets coughed up by the patient. This would make the nursing of tuberculous patients in sanatoria and hospitals a particularly dangerous occupation. Practical experience entirely disproves this, since cases of infection among nurses are almost unknown.

The work of Bartel and Spieler, just quoted, would seem to indicate that the intestinal tract is the most common avenue of infection, just as clearly as those of Flügge indicate the same position for the respiratory tract. Indeed, exposure of animals, by the former authors, to conditions as nearly natural as possible, makes their results of more value than those of Flügge, whose animals were exposed to artificially prepared atmospheres.

Both of the authors just quoted admit the possibility of infection by both the alimentary and intestinal tracts. In fact, this admission is almost universal. There is certainly no denial of the possibility of infection through the upper alimentary tract, which, as has been stated, is very difficult to separate from the upper respiratory tract. A great deal of experimental work has been done to demonstrate the occurrence of alimentary infection. The tonsillar mode of invasion has been advocated by many as a common, if not the most common, mode of infection.

Aufrecht, as recently as the Vienna Conference, reiterated his acceptance of this view, and stated that infection through the tonsils, the cervical and mediastinal lymph glands and the right heart to the lungs was the only course which he considered had actually been proven to be taken by the tubercle bacillus from the exterior to the lungs. As has been stated earlier, it is not essential, in infections of the bronchial glands and lungs through the tonsils, that lesions should exist in the tonsils or lymphatic chains leading from them.

Grober has taken the attitude that the lungs may be directly infected through the tonsils, and that the frequent involvement of the apex of the lung is explained by this mode of infection. He supports this view by the results of experimental work on dogs, in which he injected into the tonsils some Chinese ink in suspension. A considerable quantity of this ink was found in the glands directly above the costal pleura at the dome of the pleural cavity and in the efferent glands. As the apex of the lung is in direct contact with this portion of the costal pleura, it is easy to understand why granules were also found in the pleura covering the apex. He further believes in the frequency of intestinal infection in early life on the hypothesis of the anatomical similarity between Peyer's patches and the isolated follicles and the tonsils.

Infection through the medium of the intestinal tract has obtained a great deal of support in recent years. In 1902, Ravenel, in his article on "The Intercommunicability of Human and Bovine Tuberculosis," after quoting from the work of Dobroklonski, relative to the penetration of the intestinal wall by the tubercle bacillus, made the statement that in his work at the laboratory of the State Livestock Sanitary Board, he had often been struck by the extensive involvement of the lungs in animals infected by feeding and the slight injury to the intestines. He says further: "Indeed, in some animals, it has been impossible to detect any involvement of the intestine at all." He then predicted what has been fully verified since—that infection by the intestinal tract would be shown to occur more often than was then suspected. Since that time, Ravenel has added further experimental evidence in proof of this mode of infection.

The experiments of Valleé deserve special consideration, as illustrating the natural method of infection. He took 4 young calves free of tuberculosis and nursed them on two occasions at intervals of forty-eight hours from a cow infected with tuberculous mammitis. The amount of milk ingested was about 150 grams. The calves were then fed exclusively by their mothers—proven non-tuberculous—and by boiled milk. They all reacted violently to the tuberculin test thirty-five days after the nursings. They were killed on the fifty-fourth, ninetieth, one hundred and eighteenth and one hundred and forty-sixth days. The autopsies showed lesions in the bronchomediastinal glands in all of them. In 3 the alterations were much more marked than the changes in the mesenteric glands. The lungs were intact.

The same authors, in the course of two laparotomies on non-tuberculous cows, under careful preventive precautions, injected into a gland of the mesenteric chain of one of them a culture of bovine bacilli and some of the same culture into a small branch of the mesenteric vein of the other. The animal inoculated into the vein died in thirty days, showing an acute tuberculosis of the liver with very marked lesions of the bronchial and mediastinal glands. The lung and mesenteric glands were intact.

The other animal was killed on the forty-ninth day. It presented an enormous tuberculous lesion of the inoculated gland. The only other macroscopic lesions were enlarged bronchial glands, the tuberculous nature of which was determined by the inoculation of guinea pigs. The deductions from these experiments are manifest.

Calmette and Guerin carried on some experiments on cows by placing in the esophagus through a flexible sound varying quantities of a homogeneous emulsion of tubercle bacilli, which had been finely triturated in a mortar. They demonstrated infection of the mesenteric and bronchial glands in all, and of the lungs in one, by injections of the tissues into guinea pigs. They conclude, from the results of these experiments, that, of the various modes of infection, ingestion is the one which most often and most quickly determines tuberculosis of the glands adjacent to the lungs and of the lung itself. In further support of this attitude, they quote the experiments of V. Steinberge and Grysez, in which they demonstrated the production of pulmonary anthrocosis through the medium of the intestinal tract, results similar to which have been accomplished more recently by Calmette.

Calmette, Guerin and Delearde, in an article on the intestinal origin of tuberculous tracheobronchial adenopathy, reached the following conclusions: (1) That, experimentally in animals and clinically in infants, every time a tuberculous infection occurs in the tracheobronchial glands, tubercle bacilli exist in the mesenteric glands, even if they seem healthy. (2) If the infection of the mesenteric glands precedes the appearance of the tracheobronchial adenopathy, that these, as well as pulmonary tuberculosis in the child and adult, must be considered as resulting from a tuberculous infection of intestinal origin.

They based these conclusions on some experiments on calves, in which they introduced infected meals by the esophageal tube and produced lesions of the mediastinal glands, with scarcely discernible alterations in the mesenteric glands. To support their conclusions regarding infants, they made subcutaneous inoculations into guinea pigs of the triturated glands from 24. In 4 of these, the findings of the autopsy showed lesions of tuberculosis. Of these, a case of tuberculous meningitis showed the glands reddish and tumefied, but without apparent tuberculous lesions. A tuberculous bronchopneumonia showed the mesenteric glands enlarged, but without visible tuberculous lesions. A case of tracheobronchial adenopathy showed the mesenteric glands the size of pinheads, without lesions on section, whilst, in a case of pulmonary tuberculosis, with cavity and caseation of the tracheobronchial glands, the mesenteric glands were tumefied, reddish on section but without tubercles. The mesenteric glands from each of these cases, when inoculated into guinea pigs, produced tuberculous lesions.

A point which they consider of more importance was that in 3 of the infants, in whom tuberculosis had not been suspected, even at the autopsy, injection of their mesenteric glands produced tuberculosis in guinea pigs. In each of these latter cases the tracheobronchial glands were enlarged, but without tubercles, and the mesenteric glands apparently healthy.

Gaffky reported a somewhat similar and more extensive series of experiments to the Vienna Conference. In 300 children, whose mesenteric and bronchial glands he injected into guinea pigs, 33 showed tuberculosis clinically. Of these, 27 gave positive results, with enlargement of both mesenteric and bronchial glands in 22. Of the 6 which were negative, 3 died of sepsis, and in the other 3 the tubercle bacillus had probably died or become attenuated.

Of the 267 remaining cases, 30, or 11 per cent., infected guinea pigs. Of these, 12 showed both mesenteric and bronchial glands infected, 6 only the mesenteric, and 12 only the bronchial. These experiments, however, were made to disprove the greater frequency of intestinal infection, and to establish respiratory infection as the more common even in childhood, especially since his experiments favored infection by the intestine, in that, of every 6 guinea pigs injected, 4 were injected with mesenteric and only 2 with bronchial glands. Their conclusion, however, is untenable if we accept the view of Bartel above expressed—that the mesenteric glands may either destroy or so reduce the virulence of retained bacilli that it is even impossible to produce tuberculosis in animals inoculated with such glands, even when these glands have been traversed by bacilli which have eventually reached and infected the bronchial glands and lungs.

In Findel's feeding experiments, he failed in 14 guinea pigs to produce what he considered tuberculous changes. His results frequently showed swelling of the sub-maxillary and cervical glands and prominence of the intestinal follicles and Peyer's patches, but these he considered nontuberculous because he failed to find tubercle bacilli by microscopic examination. These results may be ruled out on the basis of Bartel's work, which clearly shows that the bacilli may not be found microscopically and yet be present, as shown by animal inoculations of the glandular tissues.

There are many additional contributions relating to the subject of infection by both the respiratory and digestive tracts which might be referred to, but those given are sufficient to enable us to draw the same conclusions that would be reached after a complete consideration of the literature, which are:—

(1) That it is impossible to gain any knowledge as to the port of entry either from the location or the degree of development of the tuberculous lesions.

(2) That fetal infection is proven but not common.

(3) That infection through the mouth, tonsils and pharynx is of frequent occurrence and may be produced by inhalation or ingestion.

(4) That primary inhalation infection through the lungs does occur.

(5) That infection through the intestinal tract is definitely proven.

(6) That the bronchial glands and lungs may be infected through the intestinal tract as well as through the lower respiratory tract.

(7) That the relative significance of the various modes of infection is very difficult to determine, on the basis of our present knowledge, since it has been clearly shown that it matters not from what point the tubercle bacillus is introduced, it can eventually reach the bronchial glands and lungs without leaving any evidence of its mode of entrance. It is probable, however, on account of the greater exposure of these portions of the body, that infection through the upper respiratory and alimentary tracts is the most common, and next to this, for similar reason, through the lower respiratory and intestinal tracts.

As to which of the latter two constitutes the more frequent channel, it would seem that the nature of the exposure should prove a determining factor. If infection occurs when the bacillus is introduced with the food or carried to the lips and mouth in kissing, or by infected hands, nipples, toys, drinking cups, or the various feeding utensils, it must almost certainly be by the alimentary tract. If, on the other hand, the bacilli-laden dust or droplets are inspired, they may be conveyed directly to the lungs and there produce pulmonary and bronchial gland infections.

Certainly, in infants and children, exposure to the former group of conditions is much greater than in adult life, and since we must admit that the greater portion of inhaled bacilli find lodgment in the upper air passages, from which point they may be swallowed, and since infection by the intestinal tract has been absolutely determined in children, as well as experimentally in animals, we can safely conclude that intestinal infection in early life is more common than in later years and, with the additional support of such experimental work as that of Bartel and Spieler, and the investigations of Calmette, Guerin, Delearde and Gaffky, I am prepared to believe that infection by the intestinal tract is more common in infants and children than infection through the lungs.

(Discussion on page 313.)

Clinical Memorandum.

A CASE OF ASPIRIN HEMORRHAGIC NEPHRITIS.*

BY MAURICE PACKARD, M.D.,
New York.

Edward K., four and one-half years of age. Normal birth. Only child. No history of hereditary taint could be elicited. Child was bottle fed, with few evidences of rachitis, while the mother claimed that the boy was an unusually healthy baby.

Present Illness.—The disease was ushered in by chilly sensations and fever and the child complained of pain and difficulty in deglutition. The throat was angry red but with no membrane. Temperature was 103° F.; pulse, 124; respiration, 28. Urine at this time was normal. Diagnosis of rheumatic tonsillitis was made and aspirin in 5-grain doses every four hours was prescribed, with ice spray as local measure. After two doses, that is, 10 grains, the fever subsided, the throat looked much better, but the little patient appeared worse. He was sleepy and edema was present in the face and over the tibiæ. The urine, scanty in amount, was of a uniform bloody color. The sediment, upon microscopical examination, showed numerous blood casts with fragmentation red blood cells, renal epithelium and leukocytes, disproportionate to the blood percentage.

Aspirin was immediately stopped, and the patient, after a few hot baths, quickly recovered. In a week's time the urine was normal, but another powder of 5 grains aspirin was given to determine whether the hemorrhagic nephritis was caused by the drug or whether it was an infectious disease with its port of entry the tonsil. Although the color of the urine was not so red as formerly, albumin with blood casts and renal epithelium again reappeared.

This case is unique, as I believe it is the first reported of hemorrhagic nephritis produced by the newer salicylate, aspirin.

The patient at this time, six months later, shows no changes in his urine.

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* Case shown at meeting of Clinical Society of New York Polyclinic, October 7, 1907.

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ARTHRITIS AND NEAR-ARTHRITIS IN CHILDREN.

A recent meeting of the Section on Orthopedics at the New York Academy of Medicine was devoted to the discussion of the different forms of acute arthritis in infants and young children. Inflammations in and about the joints in children are interesting for several reasons. They are not at all infrequent; the exact anatomical diagnosis is often puzzling, and the point of invasion of the infecting germ is frequently impossible to discover. Finally, the results of early treatment are surprisingly satisfactory.

Young children, and particularly infants, are very susceptible to inflammations of the joint regions whenever any part of the system is attacked by germ infection. The younger the child the more apt it is to have joint involvement; and, moreover, the number of joints infected seems to be greater the earlier in infancy the affection occurs. Any joint may be involved, but there is a proneness for infection of the small joints of the wrist, knee, foot and clavicle. Thus, pyogenic germs entering at the umbilicus or through the intestinal tract may give rise to arthritis, as may also the pneumococcus or the gonococcus. The infecting organisms of rheumatism have, of course, a special predilection for the joints, and the tubercle bacillus also finds in the joint ends of the bone a favorable site for growth. The joint regions are also very apt to be involved in certain other affections which are not so acutely inflammatory, as in congenital syphilis and infantile scurvy. In rachitis also there is a greater tendency to affections of the joint ends of the bone than of the other parts. Not only are the joints more susceptible in children, but the tissues about the joints are also more liable to inflammation in infants than in older children.

The cases of joint involvement in children under five years fall into certain groups. Shortly after birth the infections most frequently met with are those due to sepsis; somewhat later, though still during the first few months, those due to the gonococcus. Both these infections are apt to be multiple. Between the first and fifth year the child may suffer from various types of infection of several or of single joints. The infective agent may be the streptococcus, the staphylococcus, the pneumococcus, the typhoid bacillus, the influenza bacillus and occasionally the colon bacillus. Children over five years old are much less apt to have suppurative conditions in the joint regions, and when they do occur the point of invasion can usually be determined. Joint disease in children over five is usually either tuberculous or rheumatic.

In addition to the inflammations involving the joints themselves, there occur in infants and young children infections of the bone and of the cellular tissues adjacent to the joints, which frequently give rise to swellings and to other signs very similar to those found in actual involvement of the joint. Osteomyelitis and periostitis, epiphysitis and deep cellulitis often occur near the joints, and may extend into the joint capsule. On the other hand, inflammations beginning in the joint may quickly involve the tissues around the joint, and these may become more inflamed than the joint itself. In the case of the hip joint, conditions which may confuse the diagnosis are: perinephritic abscess, psoas abscess and ischiorectal abscess. It may be difficult to decide at an early stage, particularly when the region of the hip is affected, whether the infection is primarily of the joint or of the structures adjacent.

In regard to diagnosis, if the inflammation is very acute, it is usually impossible to tell from the local symptoms what form of infection is present in the joint, since the local signs are very similar whether the infecting agent is the streptococcus or some other organism. If the inflammation is subacute or of chronic type, it is more apt to be due to the tubercle bacillus, to the gonococcus, or to the agency of rheumatism. The absolute determination of the form of inflammation can only be made by study of the fluid obtained from the inflammatory focus. A probable diagnosis, however, of the form of infection can usually be made from the history of the case and from the general physical examination. If the patient has had ophthalmia or vaginitis, the probability is that the joint affection is due to the gonococcus. If there has been a preceding pneumonia, it is, of course, probable that the arthritis is due to the pneumococcus. In rarer instances the joints are affected in cases of influenza and typhoid. If the condition is less inflammatory and involves only one joint, the probability is that it is tuberculous. Rheumatism is very infrequent under two years of age, and practically unknown under one year. It is, moreover, apt to involve several joints successively, although monarticular rheumatism in the knee or hip occasionally occurs and gives much anxiety in regard to tuberculosis.

Treatment in all cases should be begun by putting the affected part at rest and separating the joint surfaces by some form of bandage or traction. In conjunction with rest, applications of wet dressings of aluminium acetate or of 60 per cent. alcohol should be made. It is surprising in how many cases this form of treatment will result in a subsidence of the inflammation. The cases should be very carefully watched, however, for evidence of suppuration. If this occurs, incision should be made at once. The operation should be very simple, merely an incision into the inflamed tissues and into the joint, if necessary, with evacuation and provision for thorough drainage. When the bone is diseased the infected focus should be removed. It is surprising how rapidly the suppuration ceases and the joints heal, with full recovery of function in young patients. Early but simple operation results not only in saving life, but in securing perfect functional results in the great majority of cases. Of course, where the joint affection is merely a manifestation of general sepsis, the conditions are not favorable.

In the matter of joint involvement in children, a careful history of the infant from birth should always be obtained, the inquiry being directed particularly to umbilical infection, early ophthalmia, vaginitis, pneumonia, typhoid, influenza and furunculosis. The patient should be undressed entirely for examination, since failure to make a diagnosis more frequently occurs because the patient is not carefully examined than because the physician is unfamiliar with the condition. The diagnosis of tuberculosis or rheumatism should be made by exclusion; and it should be remembered that infantile scurvy is frequent under one year of age. Finally, the earlier proper treatment is instituted and, if necessary, simple incision is done, the fewer the number of joints involved and the greater the chance of complete recovery of function.

Society Reports.

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, November 19, 1907.

J. W. VanDerslice, M.D., President.

Dr. J. H. Hess opened the meeting with the presentation of a case of

HEREDITARY SYPHILIS WITH HYPEROSTOSES.

The patient had had enlargements along the tibiæ when three years old and interstitial keratitis at four years. About eight months ago he began to complain of weakness and pain in the right leg. Gradually a deformity developed which consisted of a broadening of the fibula throughout almost its entire extent. This had not diminished under treatment, although the pain had been lessened.

Dr. Hess also presented a case of

CHRONIC OSTEOARTHRITIS OF THE SPINE AND TEMPOROMAXILLARY ARTICULATION.

This patient, a boy of seventeen, had an attack of rheumatism at the age of six and one-half years, from which he made a perfect recovery. Subsequently he had attacks at intervals of two to three years, recovering from each attack more and more slowly. In the fourth attack a cardiac lesion was diagnosed. Ten months ago he had his fifth attack. This began as usual in the toes, ascending to the neck and jaw, with extensive involvement and slow recovery. He had, when shown, a partial ankylosis of the temporomaxillary articulation, being unable to open the jaws more than half an inch. He could bend the head forward and back, although he could not rotate it. There was a large extosis to the left of the upper cervical vertebræ, and X-ray examination showed almost complete obliteration of the intervertebral space between the axis and the atlas, and partial ossification between the atlas and the third cervical vertebra. Except for a roughness of the first sound, the examination elsewhere was negative.

The differential diagnosis was made from gonorrheal and syphilitic osteoarthritis, tuberculosis, Paget's disease, and Still's type of arthritis deformans.

Later, in reply to inquiries, Dr. Hess said that the prognosis was good except for the deformities.

Dr. I. A. Abt presented a case of imbecility and gigantism of two fingers in a child of three years. The mother was about forty-seven years and had four other children, all of whom were in good health. The mother was forty-four when the child was born and was well during the pregnancy; labor perfectly normal. The baby had a small head and all the stigmata of an imbecile. The mother thought the hearing defective. The baby does not talk, but utters a guttural sound. No heart lesion.

The interesting thing was the hand, the child having been born with a web, which was cut when the child was five weeks old. The other hand was not involved. The deformity of hand had increased, but it had been marked at birth.

Dr. J. C. Cook presented a case of

SPINA BIFIDA AND HYDROCEPHALUS.

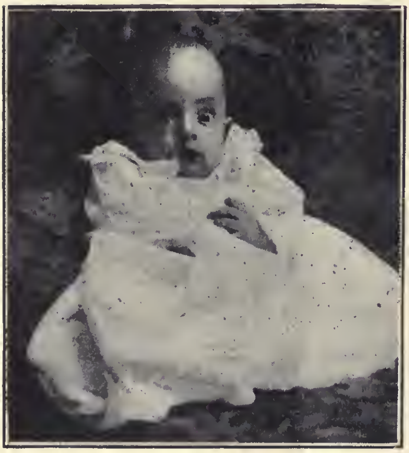

FIG. 1. SPINA BIFIDA AND HYDROCEPHALUS, TAKEN AT SIX MONTHS.

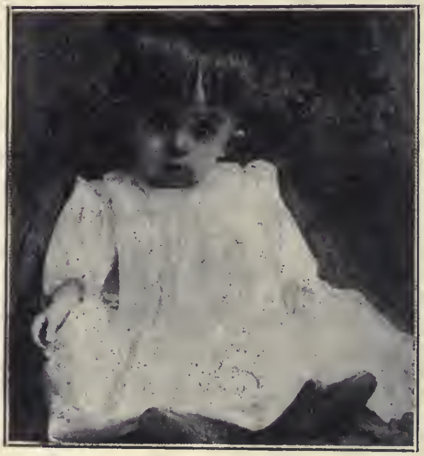

FIG. 2. SAME CASE, TAKEN AT TWO YEARS.

The child was six and a half years old and had been operated on four years ago last June, the opening being about three and one-half by four inches. He had been before the Society previous to and following the operation, and was only presented to show the marked improvement. He had had a tuberculous ulcer on one finger, entirely destroying one phalanx but not affecting the other fingers. There was partial paralysis of both legs, and he used a kind of cart in which he went from one room to another. He was bright and intelligent, attending kindergarten. The hydrocephalus had not increased since the operation, the measurements being the same as four years ago.

Dr. Cotton thought the suggestion in Dr. Abt's case of Mongolism in the face, the slight dip of the nose, the slanting eyes, the flat occiput and the exquisitely tapering, handsome fingers of the other hand, would indicate that type of imbecility apparently independent of the malformation of the right hand. It seemed to come well within the range of the Mongolian type. The tongue was rather large.

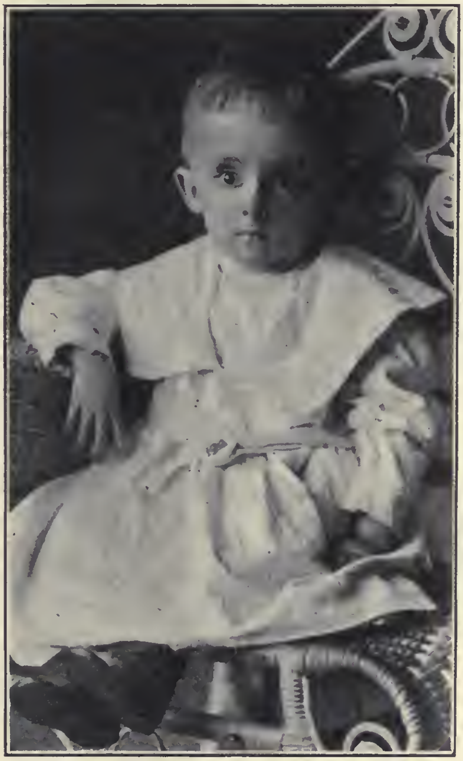

FIG. 3. SAME CASE AT SIX YEARS.

Dr. J. D. Merrill believed the case belonged to the Mongolian type of idiocy. The small head with flat occiput, the slanting eyes, insignificant nose with obstructed breathing, tapering fingers, and the tendency to obesity were points that make the classification plain. The patient showed also the extreme laxity of ligaments that make these children so difficult to handle.

Dr. Merrill had hoped to have present this evening a boy shown to the Society five or six years ago, but could get no trace of the family. This child had a general hemihypertrophy which was noticed at birth and had progressed uniformly. At the time of presentation there was a difference of from ½ to 1 cm. in the circumferences of hands, wrists, arms, ankles and legs. The condition was best described as hypertrophy, as the smaller side was normal in size for age and presented no appearance of atrophy. It was as if the sides were mismated, the larger belonging to an older child. In this case there had also been no illness of mother during pregnancy.

DR. WM. J. BUTLER read a paper entitled

CUTANEOUS TUBERCULIN VACCINATION IN THE DIAGNOSIS OF TUBERCULOSIS.

DR. H. W. CHENEY said that from his observation he considered this tuberculin vaccination harmless and valuable, and thought it might be used periodically for diagnosis in children's institutions, foundlings' homes and wherever large numbers of children were gathered together, as suggested by Von Pirquet. If used, possibly every six months, in such places, cases of tuberculosis would be discovered and could be isolated and given proper treatment in the early stage of the disease.

The reaction is probably of no value in adults or in children over five years of age.

DR. BUTLER said, in reply to Dr. Cotton's question concerning the appearance of the vaccination points after cutaneous tuberculin vaccination, that at the site of inoculation a papule, with a slight areola, appeared in the first twenty-four hours, seldom delayed to the second twenty-four hours. The papule was bright red, later darkening. Occasionally several little vesicles with turbid contents, soon merging into one, were seen. This local change which appeared so promptly disappeared in the course of several days.

DR. ABT had vaccinated some children and some adults and concurred in the technique given by Dr. Butler, although he used a different solution, taking 1 part tuberculin, 5 per cent. carbolic acid and glycerin, and 2 parts normal salt solution. With three scarifications, one for control and two for inoculation, the solution was rubbed in with a toothpick or needle.

He found the reaction striking and usually occurring promptly within twenty-four hours. The rapidity of the process was indicated by the fact that cases inoculated on Friday showed nice results Saturday and Sunday and on Monday had begun to disappear.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, December 10, 1907.

C. F. JUDSON, M.D., PRESIDENT.

DR. D. J. MILTON MILLER presented 3 cases.

CASE I. A girl of three years, who was ill with very severe cerebrospinal meningitis from March to November, but who yet recovered completely. During the course of her illness she was apparently blind and deaf and suffered from trophic ulcerations which appeared on the occiput, buttocks, sacrum, back and thighs, some of which laid bare the bone. The child was shown to illustrate how very ill these patients may be and still recover completely.

CASE II. A girl with a severe anemia (hemoglobin, 19 to 20 per cent.; red blood corpuscles, 1,740,000; leukocytes, 22,000 to 25,000, 45 per cent. of which were polymorphonuclears) fell ill with what appeared to be a bronchopneumonia. She was quite edematous when admitted to the hospital, but as the urine contained only a trace of albumin and no casts this was attributed to the marked anemia. The mucous membranes were pale and the spleen was enlarged to two inches above the umbilicus and was apparently tender to the touch. Five days after admission the temperature fell to normal but rose again in thirty-six hours and remained high until death. At autopsy the kidney was found to be the seat of an extensive suppurative embolic nephritis. The urine collected from the bladder at autopsy showed many hyaline casts. The source of the abscesses could not be found. The lungs were normal. A fuller report of this case is to be published.

CASE III. Specimens were shown from a cardiac case in which there was a diastolic mitral murmur, probably caused by an anomalous arrangement of the chordæ tendineæ. The patient, aged ten years, had had recurrent attacks of rheumatic polyarthritis. While in the hospital his physical signs were: apex impulse, sixth space outside the nipple line; upper border at the second rib; right border one inch to the right of the sternum; transverse diameter six inches; at the apex a rough diastolic murmur followed by a blowing, systolic bruit; a well-marked diastolic thrill; a well-accentuated pulmonary second sound; enlarged and pulsating liver; pulsating cervical veins; a soft murmur at the xiphoid cartilage; ascites and general dropsy. At the autopsy no narrowing of the mitral orifice was found; the valve was thickened and sclerotic and its tendons and musculi papillares were shortened. There was, however, an abnormal arrangement of the chordæ tendineæ springing from one of the columnæ carneæ near the ventricular septum—a small tendon, half an inch long, extended to one of the tendons of the posterior mitral leaflet to which it was attached. It was so arranged that during the diastole, when the left ventricle was distended, it must have offered an obstruction to the blood flowing from the auricle. Probably the thickened mitral curtains contributed to cause the diastolic murmur and thrill during life.

Dr. A. A. Eshner spoke of a case of a presystolic murmur which developed in the course of recovery from pericarditis in an adult.

Dr. James J. King reported the case of a girl of six years who aspirated a steel carpet tack which remained in the lungs twenty-six days, finally being coughed out, with complete recovery from the traumatic pneumonia which it had induced.

Dr. D. J. M. Miller said that he thought that the foreign body simply permitted the pneumococcus to attack the patient and was not itself the cause of the pneumonia.

Dr. King, in closing, said that his view in the matter coincided with that of Dr. Miller.

Dr. A. C. Rosenberger read a paper on

BACTERIOLOGICAL STUDIES OF NOMA, WITH REPORT OF SEVEN CASES.

The 7 cases included 1 following typhoid fever and 6 following measles. Of the organisms found, foremost and most abundant were the spirillum and fusiform bacillus of Vincent; next in frequency, diphtheria-like bacilli, streptococci, staphylococci and pneumococci.

Dr. Rosenberger concluded that the affection known as noma is due to a symbiosis of bacteria, the principal of which are the symbiotic organisms of Vincent. The reasons advanced for this supposition were that the disease is first evidenced by a membranous or ulcerative process; that in this stage the fusiform bacillus and the spirillum of Vincent are present in great numbers; that, later, as the process goes on to gangrene, other organisms—such as the diphtheria-like organism, the streptococcus, and other microorganisms—make their appearance; and that from this latter invasion toxemia develops, and the disease goes on to a fatal termination. These facts are borne out by the study of these cases and the bacteriological findings.

Dr. B. Franklin Royer said that he was glad that Dr. Rosenberger had emphasized the fact that the organism so often considered to be the diphtheria bacillus and associated with Vincent's is but a pseudodiphtheria organism. He believed that Vincent's angina and noma are but two different stages of the same disease. Clinically one can demonstrate three types—a membranous, an ulceromembranous and a gangrenous type. When the throat is the part affected, the disease is spoken of as Vincent's angina, but it is due to the same organism wherever it may be found.

Dr. Royer asked if these organisms had ever been grown anaerobically.

Dr. S. McC. Hamill asked Dr. Rosenberger whether the suggestion made by Hermann, of New York, a few years ago, that the fusiform bacillus and the spirillum might be but different stages of the same organism, had ever been confirmed.

Dr. Rosenberger, in closing, said that he did not believe the fusiform bacillus and the spirillum to be the same organism. In reply to Dr. Royer's question, that it had been claimed by one observer that the organism producing Vincent's angina could be grown anaerobically, but that he himself had never been able to do so.

Dr. E. J. G. Beardsley (by invitation) read a note concerning

A UNIQUE CASE OF INFECTIOUS ORCHITIS IN A BOY ELEVEN YEARS OF AGE.

Eight days after exposure to the infection of parotiditis, during which time the boy was using an antiseptic mouth wash and spray, he developed a well-marked orchitis. There was apparently no other etiological factor than the transference of the infectious principle of mumps.

Dr. Hamill said that he had seen cases of mumps in which the submaxillary glands were alone involved.

Dr. Royer said that orchitis is common in many of the infectious diseases, especially smallpox.

Dr. J. H. McKee read a brief paper entitled

A METHOD OF COMPUTING PERCENTAGE MILK FORMULÆ THAT IS REALLY SIMPLE.

The method is applicable to the top-milk method only.

Rule I. To know the ratio of the fat to the proteid in a given level of the jar, invert the fraction that indicates this level. (Upper third, 3 : 1 ; upper half, 2 : 1 ; whole milk, approximately, 1 : 1.)

Rule II. Make the percentage of the proteid desired the numerator; and the amount present in the milk the denominator. Multiply the volume of the food to be given in the twenty-four hours by this fraction. The result equals the quantity of top milk to be used in the mixture. The remainder is the diluent. Examples were then cited.

Dr. Judson asked Dr. McKee how far he could calculate variations in the formulæ by this method.

Dr. Royer said that the profession owes a great deal to Dr. McKee for having simplified what has been a puzzling thing. If Dr. McKee's formulæ are more simple than Dr. Fussell's he is ready to adopt them.

Dr. Alexander H. Davisson hoped that Dr. McKee's formulæ would soon be published so that they might be studied carefully. By the top-milk method, formulæ can be made satisfactorily, but it sometimes compels the wasting of the milk, as more than one jar is required and only the top milk used.

Dr. M. Solis-Cohen thought that Dr. McKee's method might be a little more flexible than Dr. Chapin's, but he was not convinced that it had any other advantage.

Dr. R. S. Lavenson read a paper on

CONGENITAL OBLITERATION OF THE BILE DUCT, WITH CIRRHOSIS OF THE LIVER.

Dr. Lavenson gave the report of a case in the service of Dr. J. P. C. Griffith, discussing the symptomatology and pathology and then considering the nature of the condition.

Dr. William C. Drein reported a similar case to that of Dr. Lavenson.

Dr. Lavenson, in closing, discussed the various treatments for the condition that have been reported in the literature, most of them without result.

The Society then went into executive session.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Annual Meeting before the Academy, January 2, 1908.

GODFREY R. PISEK, M.D., CHAIRMAN.

The subject for the evening was

TUBERCULOSIS IN INFANTS AND CHILDREN.

THE PATHOLOGIC FINDINGS.

DR. JOHN MCCRAE, of Montreal, Canada, read this paper. (See page 277.)

RECENT DIAGNOSTIC METHODS.

DR. W. H. PARK spoke on this subject. He said that he would limit his remarks to the recently proposed skin and eye inoculations. But before touching upon technique he thought it best to speak of the meaning of the reaction following inoculation. If one took an animal, a guinea pig for instance, and injected a minute quantity of serum into it, that animal after ten days would be sensitized; so that if a fairly large quantity of serum was injected the animal would die in convulsions; whereas, if the same dose of the serum was given to a guinea pig not so sensitized, the results would be absolutely harmless. It was also found that egg-white would sensitize an animal. It was further found that other proteids, as well as bacterial proteids, would in the same way sensitize animals. Thus, if guinea pigs, rabbits, or even men, were injected with dead tubercle bacilli, they would after ten days be sensitized. This sensitization would last for a considerable length of time, for months or longer periods, until the newly-formed substance was eliminated from the body. The important point was, that a minute quantity of suitable proteid would thoroughly sensitize an animal, or man, to similar proteids, and this sensitization would continue for months, or even years. Larger quantities did not experimentally sensitize much more than a minute quantity. When one got a reaction from the subcutaneous injection of tuberculin, it was not a reaction because of the presence of tubercle poison in the body, but because of the formation of antibodies due to the body having reacted to the tuberculous infection. Therefore, if the body ceased to produce these protective substances, the poison in the tissues adjacent to the disease and in the circulation would not be neutralized and no tuberculin reaction would occur. These reactions were not reactions to bacterial poison, but to the body products produced in response to the poison. In advanced cases, therefore, reactions would frequently not occur.

Dr. Park said that all knew, no doubt, the old method of injecting subcutaneously minute quantities of Koch's original tuberculin, using 1-1,000 dilution, and giving from 1 to 5 c.c. subcutaneously and increasing the dose. This was the old method and this gave a temperature curve and slight local disturbances at the seat of disease. This summer Von Pirquet, Wolff-Eissner and Calmette brought out new methods. When Von Pirquet was working with serum sickness and studying the reaction of vaccination with cowpox in immunized persons, he was led to try placing tuberculin upon the abraded skin, using 1-4 strength, 1 drop of which was rubbed into the abraded skin. He found that in tuberculous cases he got a typical reaction. Von Pirquet usually took an arm and made a little vaccination mark by rotating the point of the vaccine blade against the skin until a little abrasion was made. That would be the control spot. Then two other vaccinations or scarifications were made and into them was rubbed a 25 per cent. solution of Koch's tuberculin. The tuberculin should also be applied, as in ordinary vaccination, to an abrasion made by a needle. In the course of eight, twelve or twenty-four hours appeared a papular swelling and redness the size of a dime or even a twenty-five-cent piece. So by contrasting the reaction of the two scarifications with tuberculin with that without the tuberculin, one could judge the difference between the very slight inflammatory reaction due to the abrasion, and that due to tuberculin. Dr. Park had seen something over 20 positive cases of this kind and in most of them the reaction was quite striking. In about 33 per cent. there was a rise in the temperature of from 1° to 1½° along with the reaction. The cases he had seen never gave rise to other noticeable constitutional disturbances.

Wolff-Eissner believed that he might get the same reaction without the use of this scarification by applying it to the conjunctiva, and he tried using a 1-10 dilution, placing 1 drop of it on the lower eyelid. This gave a marked reaction. He did not try a much weaker solution. Calmette, in order to avoid such a marked reaction or any non-specific irritation, tried the method purifying the tuberculin by precipitating the toxins in a 95 per cent. alcohol. The precipitate was washed, dried, and a 1 per cent. solution of it made in water. This 1 per cent. solution was then used as in the Wolff-Eissner method. An important point was to note carefully the condition of the two eyes before the inoculation because one eye might be previously congested. The reaction may develop in from six to thirty-six hours. If one could only examine once, it should be after twenty-four hours. It was very important, in following up these new methods, to carefully note the amount of reaction that occurred. The following scheme has been adopted by many for the sake of uniformity:—

Two solutions are employed in diagnosis which contain 0.5 per cent. (No. 1) and 1 per cent. (No. 2) respectively and which may be used successively in each eye if time permits. In this way unnecessarily severe reactions may be avoided.

The eyelid should be held down until the drop is distributed about the sac without overflowing on the cheek. The same eye should not be used for a second test, as it appears to become sensitized to some degree by one test. The tested eye should be kept from external irritation by rubbing, wind, dust and smoke.

Reactions.—The first symptoms of a reaction appear in from three to twelve hours in most cases, but may be delayed twenty-four, and even forty-eight, hours, and continue for a week. The presence of a reaction is indicated by a scratchy feeling, secretion and redness of the inner canthus, caruncle or lower lid which may increase and include the entire conjunctiva, with edema of lids.

The following scheme was proposed for recording the degree of reaction:—

Negative: No difference in color when lower eyelids are pulled down.

Doubtful: Slight difference, with redness of caruncle.

+ = Distinct palpebral redness, with secretion.

++ = Ocular and palpebral redness, with secretion well marked.

+++ = Deep injection of entire conjunctiva, with edema of lids and photophobia, and secretion.

Contraindications.—Any existing disease of the eye or lids, conjunctiva, blepharitis, trachoma, keratitis, and iritis. Eye strain from errors of refraction need not prevent the use of the test so far as has been observed.

The objections to the test are slight. In a few the reaction when very marked may last for several days or even a week or two, but no permanent ill effects have remained.

Dr. Cutler, in nearly 200 cases, had not seen any bad effects in the use of the tuberculin in this way. Dr. Park had seen over 100 cases, and in none were there any disagreeable effects nor were there left any bad effects whatever.

Dr. Park said it was as yet too early to try to estimate the exact value of either the skin or the eye reactions. Most considered that the skin reaction was little less apt to occur than the eye reaction. In young children the reaction was believed to generally indicate an active focus of tuberculosis, while in older children the reaction became less definite, as it might mean either a present or recently healed infection. In the adult the reaction was present in such a large percentage of the cases that it was hard to know whether there was an active or a late tuberculosis, or whether the bacilli had simply been absorbed through the mucous membranes, giving no reaction whatever, except sensitizing the individual. Negative results were always helpful in excluding absorbed tubercle bacilli, latent or active tuberculosis.

LABORATORY AIDS TO DIAGNOSIS.

Dr. T. Homer Coffin read this paper. (See page 283.)

CHANNELS OF COMMUNICATION: THEIR RELATIVE SIGNIFICANCE.

Dr. S. McC. Hamill, of Philadelphia, read this paper. (See page 288.)

THE MANAGEMENT AND TREATMENT OF TUBERCULOSIS IN INFANTS AND CHILDREN.

Dr. John Lovett Morse, of Boston, read this paper. He divided tuberculosis in children into two classes—surgical, including "scrofulosis" and "lymphatism," and visceral.

Experience with children suffering from surgical tuberculosis in sanatoria abroad showed that, on the whole, they did better at the seashore than inland, and that they did better at the seashore if the climate were temperate than if it were cold or warm. The experience at the Boston Convalescent Home for Children showed that they did well inland and in a cold climate, but that a stay of at least twelve months was necessary. The delicate, slender, neurotic type of children did better inland in comparatively mild climates. He cautioned against overexercise with this class of cases. The child who was heavy, coarse and phlegmatic did better at the seashore. If amyloid or kidney disease developed, both classes did better in a warm and dry climate. This country was far behind many of the European countries in the establishment of sanatoria for surgical tuberculosis, whether for the rich or poor. But New York had started to do something during the past three years and it was hoped that other cities would begin to take steps in this direction. What was being done, however, was absolutely insufficient. Much more could be done in the way of excursions, weeks in country, and so on.

While visceral tuberculosis in adult life meant to all intents and purposes pulmonary tuberculosis, in the vast majority of instances uncomplicated, this was not the case in early childhood. At this age pulmonary tuberculosis was usually not a local disease, but part of a more or less generalized tuberculosis. The younger the child the truer this was. Children with pulmonary tuberculosis were less liable to bear extreme cold well than those with surgical tuberculosis, and withstood "hardening" and exposure very poorly.

The dietetic treatment of tuberculosis in early life was essentially the same as in adult life. The drug treatment in childhood was purely tonic and symptomatic. The susceptibility to opium, however, should be remembered. He knew nothing about the effects of tuberculin in children personally.

The children of tuberculous parents should, if possible, be sent away from home; if they could not be sent away, much could be done by regulation of their lives and by guarding against infection from the parents. Children suffering from latent tuberculosis or for any reason predisposed to it should, if possible, be given proper climatic treatment or sent to sanatoria. If this was impossible, every attention should be paid to their hygiene, food, rest and care. The children of the poorer classes should be sent to fresh-air schools, and given the advantages of weekly visits to the country or seashore. The great problem of the management of tuberculosis in childhood was to prevent its spread. Schools should be inspected at least once in six months and those infected with tuberculosis sent to sanatoria. Fresh-air schools should be established for the pre-tuberculous, and proper provision should be made to provide them with extra food. Children suffering from latent tuberculosis and surgical tuberculosis should be sent to sanatoria separate from those for open tuberculosis.

Dr. David Bovaird, Jr., said there was one question of great public importance upon which a great deal depended in the fight against tuberculosis in the next ten or fifteen years. It was the question of the mode of infection, and the relation of bovine and human tuberculosis. There were two schools; one said that 75 per cent. of the herds of cattle were tuberculous and, in these herds, 23 per cent. would produce milk that contained tubercle bacilli, and that, therefore, anyone drinking unsterilized milk from the average herd of cattle was in danger of developing tuberculosis.

The other school said that the localization of lesions in man had a definite meaning; that wherever inoculated, in most cases, they got the primary lesion, or else a localization of tuberculosis in the next adjacent lymph nodes. Therefore, they claimed the right to infer by which route the individual was infected.

Dr. Henry Dwight Chapin said that those who had studied tuberculosis in children recognized the difficulties of an early diagnosis. All clinicians looked upon the laboratory studies with the greatest hopefulness. He believed that milk-borne tuberculosis was overestimated and he said he was very glad to hear Dr. McCrae speak on that point. He had never been able to prove this from his own observation, but while tuberculosis in cattle seemed to be increasing, tuberculosis in man seemed to be decreasing. If bovine tuberculosis was of such importance this would not be true.

Dr. Harlow Brooks said that, so far as the anatomical lesions went in judging the point of infection, intestinal infection was rare, whereas respiratory infection was frequent. He agreed, however, that anatomical lesions were not infallible as pointing out the point of infection. This was equally so in animal experimentation. He had had considerable experience with animal infections; at one time he had a series of tuberculous infections to deal with in the orang-outang and the chimpanzee; he found that all he need do to prevent the dissemination of tuberculosis was to prevent its dissemination by respiration. The intestinal factor in these cases was negative. He thought this could be done to prevent infections in children.

Dr. William P. Northrup condemned the overheating of the apartments and houses, especially in New York; this caused much of the acute catarrhal conditions in children and adults. One of the best ways to check tuberculosis was by cooling the houses. It was unfortunate that the trachea and esophagus were situated so close together, for children were so apt to inhale what was regurgitated and swallow what was brought up through the trachea. He was surprised at Dr. McCrea's statement that tuberculoma in the brain was one-fourth as frequent as meningeal involvement. His experience was that very little tuberculosis occurred in the brain itself. The Calmette reaction was a great aid, and presented a remarkable phenomenon.

Dr. Rowland G. Freeman said that in intestinal infection one generally would believe that it would be a common occurrence to find the mesenteric lymph nodes involved, but such was not the case as a rule. On the other hand, there was no evidence to show that the bovine tubercle bacillus would cause such enlargements in man. In intestinal infection one may get ulceration, and again one may get no ulceration at all. Microscopically one may find the mesenteric lymph nodes involved. There may be an infection of the lymph nodes without other lesions discoverable. All this being true, one must feel that there are a great many cases which at autopsy apparently are cases of inspiration tuberculosis, but which are really cases of intestinal origin, with very little traces of the site of inoculation in the intestine left. Because a great many children were fed with the milk of tuberculous cows and did not get tuberculosis, one must not believe that there was no danger from the milk of tuberculous cows. Many people lived in direct contact with tuberculous patients and yet never acquired the disease. The milk from tuberculous cows often contained no tubercle bacilli or it was so diluted that not many got into the system.

Dr. A. F. Hess said that at present one of the greatest points of variance among capable observers was the relative practical importance of bovine and human tuberculosis, especially in infants and children. The importance of the question from a prophylactic point of view was not open to doubt. Attempts to solve this matter by means of ascertaining the frequency of tuberculosis in cattle or by entering into the previous history of the child, and considering the question of exposure to bovine or human infection, were indecisive. It seemed to him that the only way they could obtain an answer to this question was by the slow and tedious method of differentiating the types of bacilli from hundreds of serial cases.

Some deductions might be drawn from the work already done along these lines. It had been shown that primary tuberculosis of the lungs, and bone and joint tuberculosis, were almost invariably caused by a bacillus of the human type. In other forms of tuberculosis the results were by no means so uniform and did not lead as yet to any practical conclusions. The bovine infection seemed to have a greater tendency to limit itself to the point of entry, *e.g.*, in the case of cervical lymph node, mesenteric or intestinal tuberculosis. These were the main points of entry, which it should be remarked were in every case in close connection with the alimentary tract from the pharynx to the intestines. Finally, the fact should be borne in mind that bovine bacilli had almost invariably been found in the organs of children.

Dr. A. Jacobi dissented from what Dr. Morse had said regarding the giving of opium to children; it was not a rank poison, and might be of great value when they were subjects of tuberculosis. He believed the tubercle bacillus could get into the system through an intact mucous membrane, and he cited a case in proof of this statement. Pasteurizing milk was so carelessly done that Dr. Jacobi advocated the bringing of the milk to the boiling point; one then would be sure to obtain the proper temperature.

Simultaneous Malarial Infection in Both Mother and Child.—Brown (*Bulletin of the Lying-In Hospital of the City of New York,* December, 1906) found the plasmodium of malaria present in the blood in both mother and baby. Both patients recovered under appropriate treatment. The baby received calomel, grain one-tenth, every fifteen minutes, for ten doses, followed by bisulphate of quinin in aqueous solution, grains 2, three times a day, begun on the third day after the temperature rose to 104.4° F. The temperature then became normal, and continued normal until the fifth day, when it suddenly rose to 100° F., so the dose of quinin bisulphate was increased to 3 grains, three times a day, which controlled the temperature. An organic preparation of iron was then given to overcome the anemia, ½ dram, three times a day.—*Journal of American Medical Association.*

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ARCHIVES OF PEDIATRICS.

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A CASE OF ANOREXIA NERVOSA IN AN INFANT.*

BY J. P. CROZER GRIFFITH, M.D.,

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In connection with the valuable paper of Dr. Forchheimer (see ARCHIVES OF PEDIATRICS, 1907, Vol. XXIV., p. 801), the report of the following case may be of interest:—

Morton G., the son of a physician, was born May 22, 1901. He was never ill until the age of nine months, when he suffered from an attack of ileocolitis, which lasted a month. I saw him once in consultation with his father at this period. After recovery from this, the child appeared to have an aversion for anything given from a spoon or a glass. He took the breast readily, and would eat bread held in his hand. An effort was made to wean him, but he objected so decidedly that breast-feeding was continued, combined with the giving of bread, which was the only thing he would eat. Milk, broth or any other food which was given from a bottle or cup was absolutely refused. Finally, however, toward the end of January, 1903, the child being now twenty months old, weaning was deemed imperative. The baby at this time was at first successfully taught to drink water, but, after forced feeding with a spoon was faithfully tried without result, even water was usually refused. The general condition had been good hitherto, but, since the refusal of nearly all food, loss of weight took place, the child cried much of the night unless carried about, and there was some tendency to diarrhea, but neither vomiting nor fever.

After four weeks of faithful, persistent, but futile, effort by the parents to make the boy eat, I was asked to see him again, which I did February 23, 1903, he being then twenty-one months old. The systematic employment of gavage was recommended as the only method possible to check the loss of weight and strength which was under way.

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* Case alluded to in discussion of the paper by Dr. Forchheimer at the Meeting of the American Pediatric Society, May 7, 1907.

The subsequent history was most interesting. For three weeks the child was given peptonized milk regularly three times a day by gavage. In addition, he took a very small quantity of bread or zwieback. As a result, he gained weight, but, as his antipathy for all other food continued, I advised that gavage be persisted with. I did not see him again for two or three years, when I learned that it had been necessary to continue gavage three times a day for *about six months*, the food consisting of a glass of peptonized milk and a raw egg at breakfast and again at supper, with beef juice and a glass of peptonized milk for dinner. If a larger quantity than this was given vomiting followed. Attempts were made repeatedly to get him to take food in the usual way, but without success, except for the small amount of bread referred to. He, however, had learned again to take water freely. Finally, the child began to struggle violently against the use of the tube, and to drag it out after it had been introduced. Renewed efforts at compulsory feeding were consequently made, bribes and threats being employed, and the anorexia was gradually overcome at the age of about two and a quarter years. Increase of weight was then rapid, and now at six years he weighs 54 pounds. From the time the taking of food actually began, cow's milk became a favorite diet with him. He still, however, has to be almost forced to eat, and if left to himself will take extremely little. He has a strong disinclination to try any food which is new to him. He refused to taste ice-water until after his sixth birthday, and then expressed surprise that it was so good. With regard to all new articles of diet, his reasoning is voiced in his remark: "Papa, I would not taste it because I never ate it before."

This expression on the part of the child is clearly the keynote of the whole situation. The same distaste for food in general, and the same dread of any new article of diet, which is still manifested to some extent at six years, and which is clearly a nervous anorexia in its nature, evidently showed itself in this case early in life, even in the first year. There was no evidence of organic affection of the gastroenteric tract or other cause to which it could be attributed, except that perhaps the giving of medicine at the age of nine months awakened a fear of anything which was put into a spoon. Instead of disappearing soon, as is usually the case in convalescent infants, this dislike became intensified and extended, finally, to all food and methods of giving it, except the two to which the child had already become accustomed; viz., milk sucked from the breast and bread eaten from his own hand. The anorexia was now as marked and clearly as hysterical in nature as that seen in patients of greater age. Only the forced feeding prevented the excessive emaciation which often occurs in older patients.

MULTILOCULAR OVARIAN CYST SUCCESSFULLY REMOVED FROM AN INFANT AGED ELEVEN MONTHS.—The case is reported by C. W. McGillivray (*The Lancet,* June 1, 1907), into whose hospital service the child was sent with the diagnosis of tuberculous peritonitis calling for surgical intervention. The child was ill-nourished, cyanotic, with rapid pulse, dyspnea, some diarrhea, and marked abdominal distention. Nothing could be made out as to the abdominal contents, as the walls were of drum-like hardness. Some clear yellow fluid was withdrawn from the abdominal cavity and finally it was determined that the whole abdomen from diaphragm to pelvis was filled with a mass containing separate cavities filled with fluid. Under chloroform an incision was made to the left of the middle line just below the umbilicus. A large cyst came into view and was punctured, but only a little fluid escaped. The poor condition of the patient and the fact that a more extensive operation was evidently needed led to a prolongation of the incision upward to nearly the ensiform cartilage. A large double multilocular cyst was found, the two halves being nearly equal in size and attached to each other by loose connective tissue between their fibrous walls. Length, on removal, was nearly eleven inches and thickness four to five inches. In spite of the desperate condition of the child at the close of operation it eventually recovered. The author closes with some remarks on this class of growths in young children. Only one younger patient of this class is on record, as the intraabdominal condition began at the third month of life. Another feature was the retroperitoneal position of the tumor, as shown by the appendix, cecum, and ascending colon lying in front of it and stretched over its surface, and the fact that the posterior layer of the peritoneum had to be torn through in order to enucleate the tumor.—*Journal of American Medical Association.*

KIDNEY LESIONS IN THE INFANT; PATHOLOGICAL ASPECTS.*

BY R. L. THOMPSON, M.D.,
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The idea advanced by certain writers that nephritis is more common in the infant than is generally supposed has led to the study of the kidney in 50 infants who came to autopsy at St. Ann's Asylum. Many of these infants showed albumin and casts in the urine during life, but in no instance was there found after autopsy sufficient exudative or proliferative change in the kidney to warrant the diagnosis of nephritis. However, the comparative scantiness of literature on the infant kidney and certain interesting findings in the course of this work serve as apology for the present paper.

There is no classification of renal inflammation that lends itself to clinician and pathologist alike. The complex grouping of anatomical lesions seen by the pathologist is indicated to the clinician by no specific signs in many instances, and therefore a wide variety of classification has arisen that is perplexing to one who attempts to analyze the literature.

From a pathological standpoint all lesions of the kidney may be grouped primarily as (1) acute and (2) chronic; and may be further subdivided into (*a*) degenerative, (*b*) exudative and (*c*) proliferative. With a full understanding of the meaning of these terms, their combination with the anatomical kidney unit that is principally involved, as, for instance, parenchyma, interstitial tissue, or glomerulus, in a given instance, gives us a very exact idea of the condition with which we have to deal.

In this paper simple degenerative changes of the renal epithelium, unaccompanied by exudation or proliferation, are not classified as nephritis, since it is rare to find a kidney in which some such change is not present.

The 50 cases that came to autopsy may be divided, as to cause of death, as follows: Death due to bacterial infection, 23 cases. Death not due to bacterial infection, 27 cases.

The infectious cases may be divided as follows: Bronchopneumonia, 14; acute bronchitis, 1; diphtheria, 1; whooping-cough, 2; septicemia, 2; acute general peritonitis, 1; erysipelas,

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* From St. Ann's Infant Asylum and the Pathological Laboratory of St. Louis University, Medical Department.

2. The non-infectious cases included primary infantile atrophy, 22; asphyxia, 3; convulsions (cause unknown), 1; congenital valvular heart lesion, 1.

Before entering upon a discussion of the kidney inflammations included under the term "nephritis," certain other interesting findings in these cases may be noted in passing.

Errors in Development.—Occlusion of the ureter, by congenital narrowing of its bladder insertion, was observed in 1 case. Although the ureter was distended to double the size of that of the other side, there was no appreciable dilatation of the pelvis of this kidney. This case was from an infant at term.

In 1 instance a unique fetal anomaly, consisting of abnormal hyperplasia of the pyramidal portion of a fetal lobule in one kidney, was found. In this lobule, which extended somewhat above the level of the rest of the kidney surface, the tubules of cortex and pyramid failed to join, and there was a zone of undifferentiated tissue between the two segments, with resulting cystic dilatation of the tubules. (Fig. 1.) This case offered strong evi-

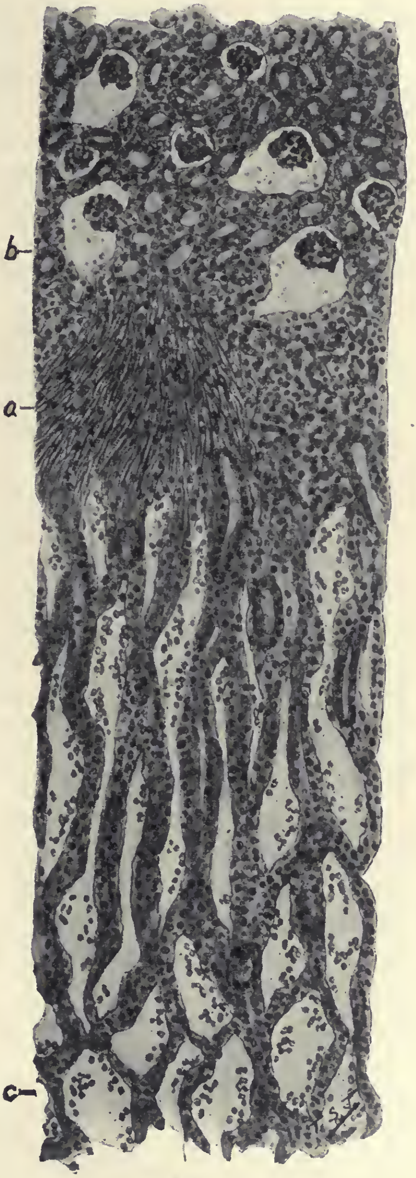

FIG. 1.

Kidney of infant, illustrating origin of congenital cystic kidney. (*a*) Boundary zone of kidney, showing zone of undifferentiated tissue separating *tubuli recti* and *tubuli contorti*, with dilatation of tubules; (*b*) above and (*c*) below.

dence of the dualistic theory of kidney development, and has been reported elsewhere* as throwing light on the origin of kidney cysts, based on the concept of kidney origin from two separate anlage.

Uric-acid infarcts were frequently found in these infants. They appear as golden-yellow streaks in the lower portion of the pyramids and are usually found in the first three weeks after birth. Kaufmann has reported uric-acid infarcts in a seven-year-old boy dead of rabies. None were present in these cases, dying after the tenth week.†

Calculi were found only once. In this case, in a newborn babe, there were three pinhead-sized irregular calculi in the pelvis of the kidney. They were found to be composed of acid urate of ammonium.

Kidney Cysts.—Braunwarth (*Virch. Archiv.*, Bd. 186, 1906) has called attention to the fact that small cysts may be found in the kidneys of infants in more than 50 per cent. of cases. These cysts represent irregularities in the formation of tubules and glomeruli, and are most frequently found in the boundary zone of the kidney. Although no special search was made for such cysts in our cases (such as searching a kidney by serial section), nevertheless they were noticed in 10 per cent. of the cases. In some instances these cysts were large enough to be seen macroscopically, but for the most part they were microscopic.

Blood Content of Kidneys.—The congestion noted in these kidneys is often extreme. In several cases the capillaries separating the convoluted tubules are extended to a diameter greater than the tubules themselves. The glomeruli are filled with red blood corpuscles and there may be some free blood in the glomerular space. In the cases of chronic passive congestion the junctional veins are sometimes dilated to pinhead size, with accompanying intense congestion of the pyramids. The best examples of congestion are found in the infants dying from infection; especially the cases of pneumonia. The infants dying with whooping-cough showed marked passive congestion of the kidneys. The uncomplicated cases of primary infantile atrophy not infrequently showed marked congestion of the kidneys, and in several instances in these cases masses of fibrin (thrombi) were found in the junctional veins.

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* Thompson, R. L. "Die Bedeutung von embryonalen Entwicklungsstörungen für die Entstehung von Zysten in der Niere," *Virchow's Archiv.*, Bd. 188, p. 551, 1907.

† Uric-acid infarcts are preserved with difficulty owing to the fact that the uric acid is dissolved out by most fixing agents. These kidneys may be best kept for demonstration by the method of Westenhoffer (*Verhandlungen der Deutsch. Path. Gesell., Siebente Tagung*, Mai, 1904), which is as follows:—

1. Hang the organ in a gauze net in a closed vessel over formalin solution, the cut surface up, not longer than four hours. The organ should be removed as soon as any solution of the uric acid is noticed.
2. Harden, for twelve to twenty-four hours, in 80 per cent. alcohol, in which a wad of cotton saturated with mercuric oxid is placed. The specimen is placed on the cotton, with cut surface up.
3. Preserve in glycerin. The bottom of the jar used for preservation should be covered with a thin layer of cotton impregnated with mercuric oxid and this covered with filter-paper or a linen cloth. At the end of two weeks it is well to bring the specimen into fresh glycerin and mercuric oxid.

Inflammation.—Coming now to a consideration of the degenerative, exudative, and proliferative changes in the kidney that are included under the term "nephritis," it may be stated that, in general, simple degenerative changes, such as might give rise to albumin and casts in the urine, are frequently found in the infant kidney, but that the more severe exudative and proliferative lesions are rarely encountered.

Gross Appearance of Kidneys.—The weight of the kidneys varied considerably in the different cases, increasing somewhat with the age of the infant, but apparently with no relation to microscopical findings in the individual cases. The average weight of the two kidneys in the 35 cases was 31 grams. The smallest kidneys (both together) weighed 16 grams (age, ten days); the largest, 56 grams (age, five months). The kidneys in the subjects dying from primary infantile atrophy weighed less in general than the other cases: as, for example, the kidneys in a child aged five months, dying from bronchopneumonia, weighed 56 grams, while the kidneys from a child aged six months, dying from marasmus, weighed 35 grams.

These weights are in general about the same as those cited by Perl (*Archiv. für Path., Anat. u. Phys.,* Bd. 56, p. 305, 1872), who gives 10 grams at birth and 22 grams at seven months as the normal weight for each kidney.

In most instances the fetal lobulations persist in the infant kidney; the depth of the sulci separating the lobules varies, however, in the different cases. The color of the kidneys varies from pale grayish white (anemic) to reddish brown, to bluish black (congestion). In all the cases the fibrous capsule of the kidney was easily detached, leaving a smooth kidney surface. Cut surface of the kidney always showed good differentiation of pyramids and medulla. In none of our cases was there anything to suggest a macroscopic diagnosis of nephritis.

Microscopic Appearance of Kidneys.—For this study, paraffin sections, stained with hematoxylin and eosin, and with Mallory's phosphotungstic acid-hematoxylin, were employed. In addition, frozen sections stained with Scharlach R. were examined for fat.

In the 50 cases examined, the greater number may be passed as unworthy of note. Many of these kidneys showed degenerative changes of the renal parenchyma, such as cloudy swelling of the tubular epithelium. In our experience cloudy swelling is too constantly met with to be considered of significance unless accompanied by some other lesion. It is true, however, that the urine in these cases may show casts and albumin in considerable amount, and therefore these cases are not always to be differentiated by the clinician from the more severe forms of true kidney inflammation. Only 2 of our cases represented severe types of this parenchymatous degeneration. In 1 case there were numerous small hemorrhages under the capsule, with destruction of renal parenchyma, and in the other there was such extreme degeneration of the tubular epithelium as to give the cortex a lattice-like appearance. Passing from a consideration of the tubules, the glomeruli are the structures next to be noted in a study of these infant kidneys.

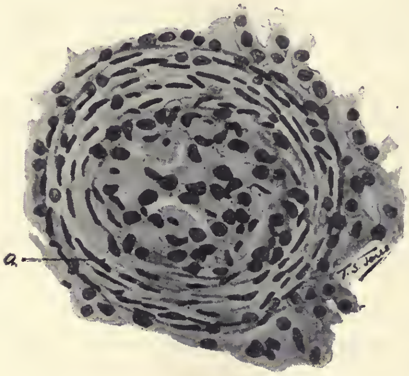

FIG. 2.

Glomerulus of kidney, showing (*a*) proliferation of cells lining Bowman's capsule.

In a number of our cases the glomeruli of the kidney were especially prominent. Glomerular changes in the infant kidney, however, must be approached with caution, since the glomerulus of the infant kidney is richer in cells than that of the adult. In certain of these infants, however, the increase of cells in the glomerular tuft was sufficient to be considered worthy of note. But it is to be doubted if such a prominence of cells in any of these cases could be considered pathological, since rarely was there any exudate in the capsular space. Therefore, notwithstanding the fact that in certain instances the glomeruli seemed to be enlarged, and even, as in 3 of these cases, some of the glomeruli showed a few cells in the capsular space, they could not be frankly classified as glomerular nephritis.

In the infant kidney proliferative change would be expected more rarely than exudation. There were 2 cases, however, where certain of the glomeruli were prominent, owing to the proliferation of the cells lining Bowman's capsule. In the involved glomeruli these cells (Fig. 2) show proliferation whereby crescents are formed, filling the capsular space, or in places leading to a more or less complete pressure atrophy (sclerosis) of the glomerulus. While striking pictures were represented in the involved glomeruli in our cases, only a very few of the glomeruli showed this picture, and therefore a diagnosis of acute proliferative capsular nephritis could not be made. One of these cases was found in connection with bronchopneumonia. The other infant died from acute general peritonitis (streptococcus infection).

As previously noted, the kidneys were in all instances examined for fat by means of Scharlach R. Fat was found in 13 of the 50 cases; 9 times in the infectious cases and 4 times in the non-infectious cases. In most instances the fat appeared as fine droplets in the basal edge of the cells of the convoluted tubules. In 2 instances the fat appeared in the straight tubules and was absent in the convoluted tubules. Usually the fat when found was quite diffusely present, but in certain instances only selected cells showed fat, the intervening cells being free from the droplets.

While this work, as previously stated, has been for the most part negative, it may be concluded that marked disturbances of circulation, and slight or moderate degenerative processes, are exceedingly common in the infant kidney. These processes, while they undoubtedly give rise to albumin and casts in many instances, are of a type that is easily repaired and probably do not influence the permanent integrity of the kidney. Severe kidney lesions, such as permanently injure the kidney parenchyma, or lead to death, are rarely found in routine autopsies in infants.

THE EYE CHANGES IN NEPHRITIS IN CHILDREN.—S. Stephenson (*British Medical Journal,* September 21, 1907). Retinal complications occur apparently less frequently in parenchymatous than in interstitial nephritis. Ophthalmoscopically no difference either quantitatively or qualitatively is determinable between these two forms of chronic renal disease. The prognosis as regards the life of the patient with renal retinitis is as unfavorable in children as in adults.—*Archives of Diagnosis, No. 1.*

KIDNEY LESIONS IN THE INFANT: CLINICAL ASPECTS.*

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In spite of the writings of Jacobi, Holt and Morse in this country, and Baginsky and Heubner in Europe, little attention has been directed toward the kidney lesions of infants. Except in cases of scarlet fever and diphtheria there is seldom a routine urine examination.

In 1824 Fischer observed cases of nephritis following scarlet fever, and three years later Richard Bright published his first work, calling attention to the most important anatomical forms of nephritis and their clinical symptoms.

Bruchard, Labadie, Lagrave, Tuvach, Zegre, Covasade and Wiederhofer observed the secondary nature of many of the nephritides. A large number of cases were seen following the infectious processes, and they believed the kidney changes to be due to toxins circulating in the blood and elaborated from microorganisms. In 1887 Wiederhofer, in a series of 1,352 autopsies on infants and young children, made at St. Ann's Hospital in Vienna, met with 46 cases of nephritis, the majority being due to scarlet fever.

There is considerable difference of opinion as regards the frequency of kidney complications in the diarrheas. Kjellberg, in 1870, made autopsies on 143 infants dead of diarrhea and found lesions of the kidneys in 40 per cent. of the cases. Since that time many have corroborated this author's work, but others, notably Holt and Morse, have not seen in their experience many cases of true nephritis following enteritis.

Holt, in 1890, made postmortem examinations on 70 cases and found nephritis but once; he found regularly present degenerative changes, such as cloudy swelling, fatty degeneration and necrosis, but no changes indicative of inflammation. On the other hand, Baginsky's pupils, Felsenthal and Bernhard, in 1894 reported

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* Read before the St. Louis Medical Society, April 27, 1907.

15 cases of nephritis in infants secondary to enteritis. They consider the pathologic changes due to circulatory disturbances, and the deficient nutrition of the tissues resulting from concentration of the blood. Toxin absorption is not denied, but is supposed by them to play a minor rôle.

Baginsky has always insisted upon the importance of paying constant attention to the kidneys in the course of diarrhea. He considers the terminal convulsions, which so often close the scene in these cases, as frequently of uremic origin. Morse's observations were made in an out-patient clinic, and, while his work is of great value, it can not, owing to the lack of control of patients, be considered final.

Morse thinks that true nephritis is a rare complication of the dysenteries, but that degenerative changes of the epithelium due to the action of bacteria and their toxins are fairly constant. It is evident that further observation is necessary to determine just how frequently kidney complications occur in the course of diarrhea.

When we remember that it is the function of the kidneys to remove from the body all injurious substances circulating in the blood, almost every disease to which the body is heir must be considered as possible forerunners of nephritis. Even vaccinia has been known to have been followed by a nephritis. Goulkewitch states that nephritis follows the pneumonia of infants extremely often. Malaria must not be forgotten as a possible exciting cause. The experience of Moncorvo in Rio de Janeiro clearly shows that nephritis is almost a regular companion of malaria; the form, however, is usually benign. He was unable to state absolutely whether the inflammatory changes could be attributed to the presence of the protozoon in the glomerular capillaries, or whether, perhaps, the condition was brought about by a toxin elaborated by the microorganisms.

Nephritis is frequently found as a complication of congenital syphilis. Furbinger met with it twelve times in 100 cases. Even eczema, impetigo, burns and scabies have been known to be followed by nephritis. Again, certain medical agents, as chlorate of potash, salicylic acid and carbolic acid, must be remembered as possible excitants. That metabolic products may furnish the necessary irritants is shown by the occurrence of nephritis in marasmus and rickets.

For years albuminuria was considered as final evidence of nephritis. Leube was the first to show that albumin at times could be found in the urine of healthy individuals. Since that time we have learned that albuminuria is quite a frequent condition and by no means is to be considered an indication of nephritis.

It is in the glomerulus of the kidney that the serum-albumin passes from the delicate capillaries into Bowman's space, mixing with the urine. It must be accepted as a fact that for this to occur there must be either a functional or organic change of the epithelial cells covering the Malpighian tufts, for normally it is these cells which prevent the exit of serum-albumin with the watery constituents of the urine from the capillary tuft.

We can exclude the endothelial cells of the capillaries from the responsibility of the albuminuria, for we know that normally albuminous fluids are able to pass through the capillary walls. Senator's experiments show that it is possible for the albumin to pass directly into the uriniferous tubules from the fine capillaries encircling them.

Frequent accompaniments of albuminuria are the hyaline and epithelial casts, fully described by Von Henle in 1842. Although the exact origin and mode of formation has not as yet been settled definitely, they represent, no doubt, coagulation products of the albuminous exudate.

In the early days of life albumin is so constantly present in the urine that it has given rise to the term physiological albuminuria of the newborn. The reaction for albumin in this instance is obtained by the heat and the cold nitric acid tests, and depends on the presence of nucleoalbumin.

I have not seen in the literature a satisfactory explanation for the presence of this substance, but it seems to me that its occurrence in part may be explained to be due to the excessive desquamation of epithelial cells from the urinary tract, so regularly seen in the first few days of life; since we know that nucleoalbumin is a product of the epithelial cells lining mucous membranes. This condition should not be called albuminuria at all, as this term ought to be limited to the presence of serum-albumin and serum-globulin in the urine. Hematuria is met with in infants as a result of scorbutus, purpura, uric-acid infarctions and calculi, pyelitis, tumors of the kidney, acute nephritis and hemorrhagic disease of the newborn. A severe case of hemorrhagic disease of the newborn was met with in one of our infants, but hematuria was not present. Gee, Roberts, Barlow and Thompson have seen cases of scorbutus in which the only symptom was presence of blood in the urine. The administration of orange juice rapidly cured the affection.

Until 1887 such a condition as primary nephritis in infancy was not recognized. At that time Holt published 5 cases, and since then has seen 5 more. In some of his cases the condition was not recognized until a postmortem examination was made. The symptoms are indefinite and almost any organ could be suspected as the seat of trouble. The onset is usually abrupt, with high fever, vomiting, diarrhea, diffuse râles throughout the chest, stupor and lethargy. In some of the cases convulsions and marked excitability were present. There was no suppression of urine and dropsy was seldom seen. Albumin and casts, which alone would direct our attention to the kidneys, were regularly present after the first few days. Holt thinks that the disease is considered rare from the simple fact that the condition often passes unrecognized. Symptoms referable to other organs being so pronounced, a urine examination is not thought of.

All must agree that routine urine examination in infants is the exception rather than the rule. No doubt the difficulty of collecting the urine is an important factor in limiting routine examination. In an institution it is a simple matter to obtain the necessary amount of urine with a soft rubber catheter, but in private practice there is liable to be an objection to this procedure. In male infants the urine may be secured by the use of a rubber bag tied about the penis. In females the urine may be caught with absorbent cotton. This procedure, however, is inferior to the method of causing the bladder to contract by the application of the cold hand, while a glass vessel is placed over the vulva. This is best done after the infant has slept two or three hours, as the bladder then is more liable to contain urine.

Since the publication of Cassal's paper in 1900, we must recognize the fact that a fatal nephritis with anasarca may occur without casts or albumin having been present at any time in the urine. Nine cases were reported, the majority being in young infants under six months; scarlet fever, syphilis and tuberculosis were excluded as exciting causes. Autopsies were obtained in 2 of the cases. In these patients, aged six and seven weeks, the condition had been preceded by a diarrhea. Microscopical examination of the kidneys warranted the diagnosis of parenchymatous nephritis. As anasarca has frequently been observed without heart symptoms or albuminuria, particularly after scarlet fever (Philip, of Berlin, observed the condition sixty times in 100 scarlet fever patients), Filatow, the Russian pediatrist, has seen fit to recognize idiopathic anasarca as a disease entity. Cassal believes, from the observations made on his patients, it is not possible in these cases to exclude nephritis. Edema, which is such a constant accompaniment of nephritis in older children and adults, is seldom seen as a result of this condition in infancy, and when met with usually depends on some lesion outside of the kidneys.

Edema amounting to general anasarca is quite frequently met with in infants suffering from anemia, malnutrition, marasmus, and following the diarrheas. Tarnier thought the condition to be due to the excessive ingestion of fluids. But it is best to accept Cohnheim's explanation, I believe, which attributes its presence to increased permeability of the blood and lymph vessels of the skin and serous surfaces as the result of the effect on the endothelial cells of circulating toxins.

From the examination of the literature on this subject one cannot refrain from thinking that in many instances the diagnosis of nephritis has been made on insufficient ground. For instance, the statement is made, "Urine contained albumin and casts, kidneys on sections rich in blood; diagnosis, nephritis." In this study our statements are based on microscopic examination, which alone, in a great many instances, can afford positive evidence of the existence of inflammation. Acute interstitial nephritis (non-suppurative) as seen following scarlet fever and diphtheria can be recognized with the naked eye from the gross appearance of the kidneys. Less severe conditions, consisting of an exudation into Bowman's capsule, proliferation of the capsular epithelium and the presence of lymphocytes in the interstitial tissue, which are positive evidence of inflammation, when slight in degree and extent, can only be recognized with the microscope.

As all rational treatment depends upon accurate diagnosis every means must be exhausted to attain this end. I believe, in many instances, it is impossible to decide during life whether degenerative changes alone are present, or whether severer lesions indicative of inflammation exist. This is well illustrated by the following case: Louis Palmer, admitted to St. Ann's Asylum August 26th. Weight 5 pounds and 15 ounces; placed on modified cow's milk. At the age of two months contracted whooping-cough, which was then epidemic at the institution. As the result of the paroxysms of coughing and vomiting, infant did poorly, and at the age of three months weighed but 4 pounds and 15 ounces.

Urine examination at this time showed a large number of granular casts, and albumin approximately $^1/_{10}$ per cent. Patient presented typical appearance of marasmus. Skin very pale, dry, no edema, heart and blood vessels apparently normal. Urine contained albumin for two weeks. Patient rallied, cough abated and at present weighs 9 pounds; urine free from albumin and casts.

Now what are we to assume was the exact anatomical condition in these kidneys? Should we say that there were merely degenerative changes of the tubular epithelium, or were changes in the sense of inflammation also present? The fact that the condition terminated favorably, I believe, is not a proof that we had merely degenerative changes in this case. When we remember that the capacity of the infant's kidneys is five times its requirements (Bruchard), and then consider its enormous reparative powers, it seems plausible that a great many of the milder inflammatory lesions are recovered from. So, I believe, in this instance, we would be justified in assuming that an inflammatory process has been present.

It should be remembered in this connection that albuminuria is frequently associated with whooping-cough. Knight has found albumin present in 66 of 86 examinations. It is generally stated that this albuminuria is dependent on circulatory disturbances. In our series of cases, in no instance, clinically, could the diagnosis nephritis be any more than suspected. Albumin and casts were frequently present, but otherwise there were no symptoms manifest. Albumin and casts are so regularly found in all infectious processes that it is not justifiable to assume a nephritis on their presence alone. This should not be construed to mean, however, that an examination for casts and albumin is valueless, owing to the fact that their presence is not pathognomonic.

That a case can occur when certain of the glomerular capsules show proliferative changes and cause no clinical symptoms is well shown by the following case: Male infant, age eighteen days, was found dead at my morning visit. I had noticed nothing unusual about the infant and had not considered it ill. The nurse stated it had taken its bottle well and had observed nothing out of the usual to attract her attention. Digestion was perfectly normal. The postmortem, made by Dr. Thompson, revealed a suppurative peritonitis of unknown origin. There was no evidence of any infectious processes in any other part of the body. The kidney in this case showed proliferation of the capsular epithelium in certain of the glomeruli.

The past summer a large number of the infants of St. Ann's Asylum suffered an attack of diarrhea. In 15 cases urine examination was made. In 4 instances albumin was found, but casts were not present. The age of these infants ranged from three months to nine months, all were thriving when taken ill, and though the condition of several became very serious all recovered. At no time clinically could a diagnosis of nephritis be entertained. These observations would support Holt's teaching of the rarity of a true nephritis as a sequela of the enteritides which is so opposed to Baginsky's view. It is very common to find casts and albumin in the urine removed postmortem in these cases, which, however, is in all probability a terminal event.

In the infant, as in the adult, it must be remembered that a diagnosis of nephritis cannot be based on the presence of casts and albumin in the urine, as slight degenerative changes may cause them to be present. On the other hand, pronounced kidney inflammation may be present with very few clinical symptoms. Edema and anasarca, when present in the infant, are usually indicative of conditions other than nephritis.

Most cases of nephritis in the infant are mild, and are secondary to pathological processes elsewhere. Owing to the milk diet and the marked reparative powers of the infant kidney, these inflammations tend to complete recovery when the primary disease is recovered from.

The diagnosis of nephritis of slight extent, which is the frequent accompaniment of various conditions, cannot be made *intra vitam* with certainty, since it cannot be distinguished clinically from the simple degenerative changes, without inflammation, which are nearly always present in infants suffering from either infectious or noninfectious diseases.

THE CALCULATION OF MILK PERCENTAGES WITH RULES AND EXAMPLES.

BY HENRY E. HALE, M.D.,
New York.

In order to do accurate work of any kind we must have, at least, approximately accurate knowledge of all the factors employed. It is now possible for the pediatrist and the general practitioner to ascertain for himself the fat and proteid content of milk in any of its forms, without elaborate laboratory procedures. The percentage of fat may be determined in a few minutes with the Babcock apparatus and the percentage of the proteids in twenty-four hours by the phosphotungstic-acid process, as described by Dr. T. R. Boggs of Johns Hopkins. The sugar content of both breast and cow's milk is sufficiently constant to make unnecessary frequent analyses to determine it.

A knowledge of the approximate percentages of fat and proteids found in the milk of the more common breeds of cattle and a similar knowledge of the milk of the various dairies in one's vicinity is essential. Also one must know the amount of fat in different parts of a quart bottle of milk after certain periods of setting.

In New York the ordinary bottled milk has been found to contain about 4 per cent. of fat, 4.50 per cent. of sugar and 3.50 per cent. of proteids. After standing eight hours the top 25 ounces of such milk contain about 5 per cent. of fat, the top 20 ounces about 6 per cent. of fat, the top 16 ounces about 7 per cent., the top 10 ounces about 10.50 per cent., the top 6 ounces about 17 per cent., and the 5 ounces about 20 per cent. fat. The lower 20 ounces contain about 1 per cent. of fat and the lower 10 ounces about .66 per cent.

Dr. Holt has shown us that in any milk set for eight hours the upper half of the bottle contains a little less than twice the per cent. of fat of that milk, the upper third a little less than three times the per cent. of that milk, and so on for the upper fourth and fifth. For example, the upper half of a bottle of 4 per cent. milk will contain a little less than twice 4 per cent., that is, about 7 per cent. The upper third of a bottle of the same milk will contain a little less than three times 4 per cent., or about 10.50 per cent. fat.

The proteid content in these various milks is nearly the same. It is only a fraction of a per cent. less in those with the highest percentage of fat than it is in the whole milk, and a fraction of a per cent. more in the skimmed milk. This shows that gravity cream is simply milk with a high per cent. of fat, and that skimmed milk is simply milk with but little fat. In the richest centrifugated creams the proteids are very much reduced. As sold in our great cities these creams should never be given to children nor to invalids. They contain a very high bacterial count because of the centrifuging and because of being "aged," that is, kept for a number of days to give them body and make them whip quickly.

Cereal waters average about 1.50 per cent. to 1.60 per cent. of starch when made with a slightly heaping tablespoonful of flour to the pint.

The percentages of food stuffs in the prepared "Infants' Foods" can be found in the books that treat of children and their diseases.

With the foregoing facts at hand we are able to determine just what a child is getting in any kind of a mixture.

The two rules given below are the ones which will be used in working out the problems that follow.

RULE I. To find the percentage of fat (or sugar or proteid) in any mixture multiply the number of ounces used of each fat (or sugar or proteid) containing factor by the percentage of fat (or sugar or proteid) it contains and divide the sum of fat (or sugar or proteid) results by the number of ounces in the whole mixture.

Example: A mixture is made up of

2 ounces of 10 per cent. cream,
10 " of whole milk,
$\frac{2}{3}$ ounce of lactose,
8 ounces of water,
—
20 " in all, and we apply the rule.

Fat from cream, 2 ounces multiplied by 10 per cent. equals	20 parts of fat
Fat from milk, 10 ounces multiplied by 4 per cent. equals	40 " " "
	60 parts. The sum of fat results.
Sugar from cream, 2 ounces multiplied by 4.50 per cent. equals	9 parts of sugar
Sugar from milk, 10 ounces multiplied by 4.50 per cent. equals	45 " " "
Sugar from lactose, .66 ounce multiplied by 100 per cent. equals	66 " " "
	120 parts. The sum of sugar results.
Proteids from cream, 2 ounces multiplied by 3.50 per cent. equals	7 parts of proteids
Proteids from milk, 10 ounces multiplied by 3.50 per cent. equals	35 " " "
	42 parts. The sum of proteid results.

These sums divided by 20, the number of ounces in the mixture, will give the percentages desired, thus:—

20	60 per cent. fat.	120 per cent. sugar.	42 per cent. proteids.
	3 per cent. fat.	6 per cent. sugar.	2.1 per cent. proteids.

These percentages represent the amount of fat, sugar and proteids the mixture contains, and with this knowledge we can intelligently appreciate the strength and proportion of the ingredients and are prepared to reduce to grams and then estimate the caloric values.*

For the sake of making Rule I. perfectly clear, we will introduce a second and more complete example. We will imagine a baby is brought into our office for treatment. The mother, after much questioning, tells us that she has been feeding it on a mixture as follows:—

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* An ounce equals 29.5 grams. One gram of fat yields 9.3 calories. Proteids and sugar each yield 4.1 calories per gram.

In each bottle she puts

2 ounces of milk.
1 ounce of cream.
½ “ of lime water.
2½ ounces of water.
1 heaping teaspoonful of lactose,
equal to ⅕ ounce.*

6 ounces.

What she has told us so far means very little, and we must inquire further. This we do, discovering that the milk is skimmed milk and that the cream is from the top 6 ounces of the bottle. Thus the milk used would run about .75 per cent. fat, 4.50 per cent. sugar, 3.50 per cent. proteids, and the cream about 18 per cent. fat, 4.50 per cent. sugar, and 3.25 per cent. proteids. Having learned these facts we proceed to apply Rule I., first for fat, next for sugar, and last for the proteids.

Milk,	2 oz.	multiplied by	.75%	equals	1.50	parts of fat from the milk
Cream,	1 oz.	“ “	18.00%	“	18.00	“ “ “ “ “ cream
				Which gives us	19.50	“ “ “ in all.

Milk,	2 oz.	multiplied by	4.50%	equals	9	parts of sugar from the milk
Cream,	1 oz.	“ “	4.50%	“	4.50	“ “ “ “ “ cream
Lactose,	.20 oz.	“ “	100.00%	“	20.00	“ “ “ “ “ lactose
				Which gives us	33.50	“ “ “ in all.

Milk,	2 oz.	multiplied by	3.50%	equals	7.00	parts of proteids from the milk
Cream,	1 oz.	“ “	3.25%	“	3.25	“ “ “ “ “ cream
				Which gives us	10.25	“ “ “ in all.

The totals, then, are divided by

6	*Fat,* 19.50 parts.	*Sugar,* 33.50 parts.	*Proteids,* 10.25 parts.
	3.25% fat.	5.58% sugar.	1.70% proteids.

Thus we have reduced to intelligible terms the meaningless things the mother told us. Had the whole day's food been prepared at one time, as it should be done, the calculations would have been made in precisely the same manner.

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* A Chapin ounce dipper, even full of milk sugar, varies in weight from 245 grains to 280 grains Troy, with simply moderate joggling to settle it.

When the sugar is loosened in its can, or carton, and dipped out, a heaping tablespoonful varies from 235 grains to 338 grains. The damper and more sticky the sugar the more will remain on the spoon, Mallinckrodt's and Merck's running heavier than Squibb's. A dipped and then struck tablespoonful runs from 140 grains to 172 grains. Here more of the sticky sugar pushes off than of the dry.

A dipped heaping teaspoonful runs from 85 to 100 grains, averaging approximately 1-5 ounce. A dipped and then struck teaspoonful holds from 39 to 47 grains.

RULE II. To find the number of ounces of any factor (be it cream, milk, etc., or sugar) that must be used to obtain any desired percentage of fat (or sugar or proteids), multiply the number of ounces in the whole mixture by the percentage of fat (or sugar or proteids) desired and divide the result by the percentage in which the fat (or sugar or proteids) occurs.

Example: We wish to make up a 30-ounce mixture containing 2.50 per cent. fat, using whole milk and water. Thirty ounces multiplied by 2.50 per cent. equals 75; this divided by 4 per cent. gives 18.75 ounces as the number needed to give the required amount of fat.

By way of further example, we will make up a 30-ounce mixture containing 2.50 per cent. of fat, 6 per cent. of sugar, and 1.75 per cent. of proteids. Here the problem is complicated by the fact that the fat and proteids must both be entirely derived from the milk. The first step is, therefore, to ascertain the relation which the fat and proteids bear to each other. To do this we divide the percentage of the proteids by the percentage of the fat; thus, 1.75 divided by 2.50 gives .7. Which means that the relation of proteids to fat is as 7 is to 10. We now endeavor to find what portion of a bottle of milk has fat and proteids in this proportion, or approximately so. In looking back over the percentages of fat and proteids in different portions of a bottle, our eye lights upon the upper 25 ounces, which contain 5 per cent. fat and 3.50 per cent. proteids, exactly the thing we want. Having now found a milk with the fat and proteids in the proportions desired, we proceed at once to find the number of ounces necessary to give the required percentage of either the fat or proteids. It makes no difference which is chosen to work with, the proportion remains undisturbed. We will choose to work it out for the proteids. Applying Rule II., we multiply 30 ounces by 1.75, which gives 52.50; this divided by 3.50 per cent. gives 15 ounces as the number of ounces needed to supply both fat and proteids in the desired amounts. We notice that in this case the amount of milk happens to be half of the bulk prepared, consequently the dilution is one-half, which proves our calculation and tells us further that the sugar supplied by the milk is one-half of 4.50 per cent.; that is, 2.25 per cent., making it unnecessary for us to work it out by Rule I. There is, then, 2.25 per cent. of sugar supplied; 3.75 per cent. must still be added to make up the required 6 per cent. We apply Rule II. and multiply

30 ounces by 3.75 per cent., which gives 112.50, and this divided by 100 per cent. (the percentage of sugar in lactose) gives 1.125 ounce as the amount of lactose that must be used. This amounts to simply finding what 3.75 per cent. of 30 ounces is, as we realize that 3.75 per cent. should be written .0375.

As has been pointed out by Dr. Holt, these calculations may be sometimes much simplified by estimating for amounts of 20 ounces or a convenient fraction thereof, and taking advantage of parts of the bottle that have the fat and the proteids in the proportions desired, as we have done above. This method works especially well with the upper third and upper half of a bottle.

The upper third contains three times as much fat as proteids; that is, in the ordinary bottled milk it contains about 10 per cent. fat and a shade less than 3.50 per cent. proteids. The upper half contains twice as much fat as proteids; that is, 7 per cent. fat and 3.50 per cent. proteids.

In the use of 10 per cent. milk it is very simple, for to obtain a certain percentage of fat in the 20-ounce mixture it is only necessary to multiply the desired percentage by 2 to find the amount of milk needed. This is clear when we look at it a little more closely. One ounce in 20 is evidently in the same proportion as 5 in 100; that is, 5 per cent. This 1 ounce is only $^1/_{10}$ fat, so the amount of fat it gives is $^1/_{10}$ of 5 per cent., which is .50 per cent. or ½ per cent.; that is, one-half the number of ounces used. For every 1 per cent. of fat desired, 2 ounces of such a milk must be used in each 20-ounce mixture.

The proteids are one-third the fat; thus 1 ounce of this 10 per cent. milk yields scant .17 per cent. proteids in a 20-ounce mixture.

The sugar is a little less than half the fat, or about .23 per cent. in the 20-ounce mixture. As lactose is 100 per cent. sugar, each ounce added increases the sugar just 5 per cent.

In using the upper half of the ordinary bottled milk, the calculations may be done as follows: This milk contains 7 per cent. fat, 4.50 per cent. sugar, and 3.50 per cent. proteids; that is, the proteids are just half the fat and the sugar is .64, or approximately two-thirds of the fat, and may be so considered. We have seen that 1 in 20 is 5 per cent. One ounce of milk, 7 per cent. fat, in a 20-ounce mixture gives to that mixture that part of 5 per cent. which 7 per cent. is of 100 per cent., namely, $^1/_{14.3}$. $^1/_{14.3}$ of 5 per cent. is .35 per cent.; therefore, each ounce gives .35 per cent. of fat, which is considered $\frac{1}{3}$ per cent. This enables us at a glance to tell how many ounces are needed to give any desired percentage, namely, three times as many ounces as per cent. of fat wished.

The proteids in the mixture would be in the same proportion as in the milk used, namely, half the fat.

The sugar would also be in the same proportion as in the milk; that is, two-thirds as much as the fat.

Example: We wish 3 per cent. fat, and take 9 ounces from the upper half of a bottle. Applying Rule I. as a test, the mixture is seen to contain 3.15 per cent. fat, which is close enough. We will now, by way of a more complete example, take a formula and work it out. We wish in every twenty-four hours to give a baby 33 ounces of a mixture containing 2.50 per cent. fat, 7 per cent. sugar, and 1.25 per cent. proteids. In order to have a margin for waste and possible breaking of a nursing bottle, we will make up 40 ounces. This will require just twice what the 20 ounces do. To make up a 20-ounce mixture with 2.50 per cent. fat, we take as many ounces of the 7 per cent. milk as three times the percentage of fat desired. This gives 7.50 ounces as the number to be used. For 40 ounces twice as much is taken.

The sugar is two-thirds of the fat; that is, 1.66 per cent. of sugar is supplied by the milk. We desire 7 per cent., so there is lacking 5.44 per cent.; that is, 5 per cent. and approximately $^1/_{10}$ of 5 per cent. more. One ounce of lactose gives the 5 per cent. and 1 drachm more is near enough to the $^1/_{10}$ desired. Thus 1 ounce and 1 drachm will bring the sugar up to 7 per cent. in the 20-ounce mixture, and twice as much will be needed in the whole amount being mixed.

The proteids, because of their proportion, must be one-half the fat; that is, 1.25 per cent. (or exactly 1.30 per cent.), the percentage wished. The whole mixture will then be made as follows:—

15 ounces upper half of bottle.
25 " water.
2¼ " lactose.
———
40 ounces.

There remains a still more complicated problem that we must consider, but this, too, resolves itself into a process that any of us can understand. The problem is the calculating of amounts of cream and whey and sugar necessary to obtain desired formulæ with the proteids split.

The fat, sugar and albumin content of different wheys vary very much. The fat is always low. Hoppe-Seyler gives it as about .33 per cent. Adriance has found it as high as .94 per cent.

The sugar is variously given from 4.79 per cent. (Koenig) to 5.49 per cent. (Adriance).

The albumin has been found as low as .30 per cent. and as high as 1.39 per cent. The latter figure is Van Slyke's. He found it in a specimen from a cow during the tenth month of lactation. He further says that .70 per cent. albumin is a fair average, and that in whole milk the proportion of calcium casein to albumin varies from 2.6 to 5.6 parts to 1, 3.6 parts to 1 being an average for herd milk.

The foregoing simply shows that to feed intelligently, which means successfully, with whey proteids, it is essential to know just what the whey at hand contains. The experience of Dr. F. M. Fry, as reported in the ARCHIVES OF PEDIATRICS for November, 1906, forces this upon us. He was led to believe he was using a whey with 1 per cent. of albumin, which, upon analysis, was found to have but .50 per cent.

In the absence of an analysis of the whey to be used, it may be considered as containing .33 per cent. fat, 4.80 per cent. sugar, and .70 per cent. albumin. These are the percentages used below.

It is evident that it is quite impossible to obtain a mixture containing more than .70 per cent. albumin, excepting in special cases where it is found to be in greater amount in the milk, or by the use of some plan of concentration, as has been done by Dr. Fry. In fact, because of the dilution by the cream that must be used, we cannot make quite as high a percentage of albumin as the whey contains.

For example, we will make a 20-ounce mixture containing fat, 2.50 per cent.; sugar, 7 per cent., and proteids, .85 per cent. $\begin{cases} \text{albumin, .60 per cent.} \\ \text{calcium casein, .25 per cent.} \end{cases}$

In working out the parts of cream and whey that are needed, we must remember that each of our factors contains fat, sugar and proteids. The cream proteids are mixed—calcium casein and albumin. The whey proteid is entirely albumin. Thus we know that the .25 per cent. calcium casein must be supplied by the cream and that that much calcium casein is accompanied by $^1/_{3.6}$ as much albumin. So we divide .25 per cent. by 3.6 to find what 1 part is. This division gives .069 per cent., which we will call .07 per cent. This amount of albumin the cream will supply and the whey must supply the remainder, namely, .53 per cent. We now apply Rule II. to find how much whey will be needed. Twenty ounces multiplied by .53 per cent. equals 10.6 parts; this divided by .70 per cent. gives 15.14 ounces for practical purposes, considered 15 ounces and 1 drachm. Thus the albumin is arranged for.

Next we will fix the fat and calcium casein. We first find how much fat the whey supplies. Applying Rule I., 15.14 ounces multiplied by .33 per cent. gives 4.9962 parts, which, divided by 20 ounces, yields .249 per cent., considered .25 per cent. fat, leaving 2.25 per cent. to be derived from the cream. The cream then must contribute 2.25 per cent. fat and .25 per cent. calcium casein. We see these bear to one another the relation of 9 to 1. A cream, then, approximating this relation of fat and calcium casein must be found. The proportion 9 to 1 shows offhand that the cream will run high in fat, say 20 to 25 per cent. Such a cream will contain about 3 per cent. total proteids, calcium casein and albumin in the proportions seen above, namely, 3.6 parts to 1. Three per cent. represents, then, the total proteids; that is, the sum of the calcium casein and albumin, 4.6 parts, and 1 part would be .65 per cent. and represents the amount of albumin present. The remainder of the 3 per cent. is 2.35 per cent. and represents the amount of calcium casein. The cream, to have the fat and calcium casein in the required proportions, must have of fat 9 times 2.35 per cent., which is 21.15 per cent. This may be approximately obtained by using the upper 5 ounces, scant, of ordinary 4 per cent. bottled milk. To find how much of this will be needed to supply 2.25 per cent. in the mixture, we apply Rule II.—20 ounces multiplied by 2.25 per cent. gives 45 parts; this divided by 21.15 per cent. gives 2.129 ounces, considered 2.13 ounces, or about 2 ounces and 1 drachm.

The sugar alone remains to be arranged for. We apply Rule I., and find that the cream and whey together supply 4.08 per cent. The remaining 2.92 per cent. must be supplied by lactose. By Rule II., .58 ounce, or approximately 4⅔ drachms, is the amount needed to do this.

Everything is now supplied excepting the bulk, thus:—

Whey	15.125 ounces	
Cream	2.125 “	
Lactose	.58 ounce.	Not adding to the bulk.
	17.25 ounces	

The 2.75 ounces, by which this is short of 20 ounces, are made up by adding water to that amount.

Our problem has now been solved, and we know that to obtain a 20-ounce mixture with .33 per cent. fat, 7 per cent. sugar, and .85 per cent. proteids { albumin, .60 per cent.
calcium casein, .25 per cent.
there must be used:—

Whey	15.125 ounces
Cream, 21.15 per cent. fat ..	2.125 “
Water	2.75 “
Lactose	.58 ounce
	20.00 ounces

Examples could be multiplied, but as the principles of calculation are the same we will forbear.

Congenital Sinuses of Lower Lip.—The child, whose case is reported by Clogg (*British Journal Children's Diseases*, February, 1907), was born with a severe degree of bilateral hare-lip and cleft palate; the premaxilla stood out prominently. The latter was broken and bent backward, and the upper lip repaired over it. The interesting condition was, however, seen on the lower lip. On the upper surface of this lip on either side of the middle line was a papilla; the two papillæ were symmetrical, and surrounding them in the form of a semicircle on the aspect toward the mouth was a groove, and leading from this furrow was a sinus, which passed downward into the lip for about a quarter of an inch. The two sinuses ended blindly, converging slightly, and were situated immediately beneath the mucous membrane of the lip. Issuing from the sinuses was a mucoid secretion.—*Journal of American Medical Association.*

EMPYEMA AND GANGRENE OF THE LUNG COMPLICATING TYPHOID FEVER IN A CHILD OF SIX YEARS.*

BY D. J. MILTON MILLER, M.D.,
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It is not my intention, in making this report, to discuss the subject of pulmonary gangrene in early life. In a paper read before this Society† in June, 1907, I have attempted to do this exhaustively. I desire simply to rehearse, in as brief a manner as possible, the main feature of another instance of this uncommon and fatal affection. Nor have I endeavored to discover the frequency of pulmonary gangrene as a complication of typhoid fever either in adults or children; but that it is most unusual I am quite certain. In an exceptionally large experience with enteric fever in both early and adult life, the case, whose history I am about to relate, is the first of its kind that I have encountered.

In my former paper, in discussing the etiology of pulmonary gangrene in children, the following points were brought out: It is a secondary affection; it generally occurs in debilitated subjects; it may supervene in the course of any of the acute infectious diseases, especially measles; it frequently follows, or is associated with, putrid bronchitis, lobar and catarrhal pneumonia, tuberculous cavities, and abscess and apoplexy of the lung; it may result from emboli from bone caries, gangrenous processes in skin, vulva, vagina, and in various organs and parts of the body; it may follow otitis media; it is frequently due to aspiration of food, foreign bodies, and septic materials from necrotic processes in the mouth and upper air passages; its bacterial cause is unknown, unless it be the same as that of noma; it may occur in a perfectly and previously healthy child, and in subjects debilitated by prolonged fever, without apparently any sufficient cause; and, finally, whatever the associated condition, the entrance of the bacteria of putrefaction into the lungs is essential for the production of gangrene.

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* Read before the Philadelphia Pediatric Society, January 14, 1908.

† "Gangrene of the Lung in Early Life," Journal of the American Medical Association, November 23, 1907, pp. 1759-61.

The symptoms of gangrene of the lung are those of its primary affection, in conjunction with the signs of general sepsis, fetor of the breath, putrid sputum, hemoptysis, and, *sometimes,* localized signs in the lungs, as of a cavity, especially when the signs of a cavity gradually develop. Fetor of the breath is a symptom of the greatest significance. The breath is horribly offensive, and may be perceptible some distance from the patient; although in estimating the value of this symptom care must be taken to exclude necrotic processes in the mouth and upper air passages, so common in children. It must be borne in mind, also, that fetor, cavernous signs, or even pulmonary symptoms of any sort, may be absent—that the affection, in fact, may be entirely latent. Unless operative measures are resorted to, gangrene of the lung is almost always fatal. Spontaneous recovery occasionally occurs, as in the remarkable case reported in my paper above referred to. In the case here reported the issue was fatal, although operation was performed as early, as under the circumstances, was possible:—

M. A., a white girl of seven years, was admitted to the Children's Hospital on November 13, 1907, the eleventh day of typhoid fever. At the time of admission the patient presented the sign of a moderately severe attack of enteric fever. The temperature ranged between 101°-102° F.; the pulse was 120; the respiration 24. The spleen was palpable and rose spots were present. There was diarrhea. The Widal reaction was positive on the eleventh day. The leukocytes numbered 4,400; the hemoglobin 72 per cent. The urine was negative. Examination of the lungs revealed a few râles. The patient was not especially prostrated or debilitated. On November 15th (fourteenth day) some fine râles were noticed over the posterior and lower portion of the left lung; the abdomen was distended, and the child appeared more prostrated. Three days later (November 18th, seventeenth day of the disease) flatness was observed over the posterior and lateral portions of the left chest, as high as the seventh rib, and the breathing was faintly bronchial. A small quantity of turbid fluid was removed by exploratory puncture. This contained diplococci and streptococci. Bouillon cultures showed chains of diplococci, but no typhoid bacilli. The breath now became very offensive, and the prostration increased. The temperature also rose, reaching 103°-104° in the evening, with daily fluctuations of 3° or 4°.

By November 21st (twentieth day of attack) the axillary flatness had risen to the fifth interspace, and posteriorly extended from midscapula to base. Absent voice and fremitus, distant bronchial breathing, egophony and other signs of effusion were present; but three exploratory punctures, at as many different places, failed to discover fluid. Cough now became almost constant, and the breath extremely offensive (putrid and fecal-like); but there was no sputum.

Constitutional Symptoms.—Diarrhea, prostration and signs of hectic were present and marked. On November 25th (twenty-fourth day of disease) an exploratory puncture showed the presence of turbid sanguinolent fluid. Because of the mechanical discomfort this was followed at once by the aspiration, under the influence of ethyl chlorid, of 350 c.c. of an offensive, serosanguinolent fluid. Much relief followed, and on the following day Dr. Wharton resected a rib, establishing free drainage. Only a few ounces of fluid were found at operation, but the lung was friable and spongy, and the odor so horribly offensive that the diagnosis of gangrene was thereupon made. The patient survived the operation three days, dying upon November 29th (thirtieth day of the disease), notwithstanding the active use of stimulants, oxygen, saline infusions and other well-known and tried measures for such conditions. The odor after operation was so offensive and penetrating that it filled not only the room in which the patient lay, but permeated, also, the main surgical ward adjoining. Cultures from the subsequent exploratory punctures did not differ from the one first made, *viz.:* they showed the presence of diplo- and streptococci; typhoid bacilli were not found. A blood culture made on the twenty-second day was negative. After the onset of the pulmonary signs the urine contained albumin and many granular casts. At this time, also, the leukocyte count rose to 11,000. Several examinations of the sputum (obtained by swabbing the throat during coughing) revealed neither tubercle bacilli nor pneumococci. Unfortunately, an autopsy could not be obtained.

In one of the recognized varieties of pulmonary gangrene, the necrotic process begins in a portion of the lung situated beneath the visceral pleura, which is destroyed, and a gangrenous empyema or pyopneumothorax results. The case I now report comes under this category.

THE INDICATION FOR STIMULANTS IN PEDIATRIC PRACTICE.*

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Laennec was the first to call attention to pathological changes of the heart in acute fevers; he found, postmortem, softening and fragmentation of the myocardium.

Virchow's classical researches on parenchymatous inflammation of the heart advanced the knowledge of cardiac impairment in acute inflammatory diseases; while to Hayem belongs the credit of having first described interstitial myocarditis; he also mentions a productive endarteritis of the coronary arteries with thrombosis, which occasionally caused sudden death in typhoid fever. A perusal of the literature makes it appear that a great deal of attention has since been paid to the morbid changes in the circulatory apparatus in the acute fevers. The work done in the last few years by Romberg, Paessler, Rolly, Wiesel, Ortner and many others has brought about a better understanding in the matter, possibly on account of improved methods of examination; facts have been brought out which in the future must influence therapeutic methods.

Postmortem examinations on a large number of cases—from one-half to sixteen years of age—by Wiesel have shown that the walls of the arteries become very frequently diseased in the course of various infectious diseases like measles, scarlet fever, diphtheria, influenza and typhoid. In typhoid he found the changes of the arteries constantly, often more so than in the heart, which sometimes would escape.

Wiesel believes that sudden death in infectious disease is occasionally caused not so much by a diseased heart muscle as by disease of the blood vessels.

The early occurrence of arterial changes is also shown by clinical observations. Paessler and Rolly point out that the onset of circulatory disturbance in diphtheria is characterized solely by the paralysis of the vasomotors, with loss of arterial tension; this is compensated by an increased heart action; the more pronounced the paralysis of the vasomotors, the more active the heart action.

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* Read before the Section on Pediatrics, New York Academy of Medicine, February 13, 1908.

Similarly Ortner believes that in typhoid the vasomotor nerves suffer earlier in the disease than the heart, which compensates for the atony during a shorter or longer period and only shortly before death becomes paralyzed; death ensues, not from cardiac failure and not from vasomotor paralysis alone, but because both become paralyzed simultaneously. From these investigations it appears that the indications for the use of cardiac stimulants are mainly empirical.

A great many diseases of childhood run a typical course; they have a tendency to recovery with any, or perhaps in spite of, treatment; the outcome of disease is not so much the result of choice of drugs as dependent on the virulency of causative factors and individual resistance; for instance, we have no drugs to accelerate the crisis of pneumonia or to avert a complicating empyema; besides, in the child with more active processes of metabolism the diseased organ has a greater ability for repair than in adult life. Nature herself is a great therapeutist. Whenever infectious disease attacks the system, antitoxins and antibodies are prepared in the blood for the elimination of hostile bacteria and the neutralization of their toxins; and the principal duty of the physician is not so much the prescribing of drugs—though even in our progressive age the practitioner may find it difficult to do without them in private practice—as to give the patient the benefit of good hygienic and dietetic treatment and to give relief for urgent indications; in short, to place the patient in the most favorable condition and assist the defensive agencies of the system to overcome the deleterious effect of disease; not to remain indolent and indifferent; not expectant but symptomatic treatment.

The promise of recovery from disease depends greatly on the relative integrity of the heart muscle; and the prevention of cardiac impairment, which threatens the child even more than the adult, is one of the main duties in the management of systemic disease of childhood; this is to be accomplished not so much by giving cardiac stimulants early at the outset of the disease as by avoiding drugs which have a depressing effect on the heart or such as derange the stomach. Flatulency or distention of the abdomen will seriously interfere with the heart action, as will any other measure which unduly excites the patient. Only when weakness of the heart becomes evident are heart stimulants indicated; the aimless administration of digitalis or strophanthus and especially alcohol is not advisable, and often harmful.

It would be difficult, and hardly possible, to determine exactly the choice and dosage of stimulants in the treatment of diseases of childhood. There are many therapeutic variations dependent on individual tolerance, and since we do not treat the disease, but the individual, it must be left to the judgment of the physician to select the suitable treatment; only general indications may be outlined.

I believe that alcohol is one of our best heart stimulants. Children tolerate alcohol generally very well, and I should not like to do without it at the bedside of the feverish child. If, however, a healthy child be taken ill with a lobar pneumonia, alcohol is no more indicated in the first few days than in the first few days of most acute fevers; it will, however, be required when the strength of the little patient is depressed and the pulse is compressible and soft—between 120 and 130—usually in the precritical stage. It may be earlier needed when the pneumonic process complicates any of the systemic diseases, or in protracted illness, and mainly during defervescence and convalescence; it should be given in moderate dose only, in the form of good brandy or whiskey; to a child of one year about 2 to 4 grams every three hours; to an older child—three to four years—double the amount. It is well to dilute it sufficiently with water or milk. If there be an intolerance to spirits, tokay, sherry or decarbonated champagne may be substituted for them. Most beneficial is alcohol in septic cases with asthenia. Here it may be used in very large quantity without unpleasant effect, no stupor or intoxication following; the heart action improves and with it the general condition of the child. Cases of erysipelas, with profound sepsis in the infant, are often influenced as little by external applications as by antistreptococcic serum, and generous doses of alcohol and camphor seem to be the only remedy to resort to. As another instance where heroic doses of alcohol may be required, I should like to mention profound sepsis in children ill with diphtheria and the septic varieties of scarlet fever. Such an experienced observer as Jacobi says: "Here it is almost impossible to give too much—6 ounces of whiskey daily to a child when 1 or 2 fail, and 10 or 12 when 6 fail." Kerley mentions a child of fourteen months, ill with diphtheria, that took 4 ounces of brandy in twenty-four hours without showing signs of intoxication.

At the onset of signs of cardiac weakness in acute fevers, shown by weakened first sound, accelerated pulse rate and reduction of arterial tension, besides alcohol the use of digitalis, strophanthus or strychnin is indicated. Children tolerate digitalis, though occasionally even small doses derange the stomach. It is necessary to control carefully the physiological action of the drug and discontinue its use at the proper moment. Cumulative effect is more prone to occur in children than in later life. As it takes some time before its influence is manifested, it will not be used if quick effect is wanted. It may be given in the form of a reliable tincture of digitalis—often very unreliable—1 drop for each year of the child three times a day, or in the form of the fluid extract, which has to be given very carefully—to an infant of a few months about ♏ $^1/_{10}$ every three hours. Some prefer the tincture of strophanthus, which is somewhat similar in its action to digitalis; it has no cumulative effect and may be used for a longer time.

One of the most useful drugs in combating myocarditis, cardiac irregularity with a moderately soft and intermittent pulse, is strychnin; it may be given alternately with whiskey per os. A child of one year will bear gr. $^1/_{200}$ three times daily; for a child of two to three years the dose may be increased to gr. $^1/_{150}$ to gr. $^1/_{100}$ three times a day. If the condition is more serious or advancing, it should be given hypodermically, and the drug should be pushed until symptoms of the physiological action, such as slight twitching of the muscles of the face and the backs of the hands, make their appearance. Strychnin is somewhat contraindicated in great excitability of the nervous system and if there be any tendency to convulsions.

Digitalis is very useful in the treatment of chronic cardiac disease; it should, however, not be given indiscriminately as routine treatment, only when signs of failing compensation appear, such as rapid pulse, dyspnea on slight exertion, oliguria and edema. It is important to give the drug in comparatively large doses until its effect is evident. If the pulse rate is lowered, the edema disappears and the kidney secretion increases, it should be discontinued temporarily, to be given again after an intermission; in its place another heart tonic may be exhibited, like caffein. This is an excellent drug, but sometimes causes sleeplessness; it may be given in a daily dose of ½ to 1 grain for each year. In this manner digitalis may be given if needed for a longer time, always alternating it every four to five days with another stimulant. Long continued use of digitalis in small doses is not commendable in the treatment of chronic heart disease in children.

In children with congenital heart lesions, with communicating ventricles, the administration of digitalis may prove injurious, as with greater efficiency of contraction of the left ventricle a larger amount of blood will be thrown into the right side and aid in impeding the pulmonary circulation. It should be used very carefully only when signs of myasthenia become evident, with constant dyspnea and very small radial pulse.

Recently two new preparations of digitalis have been recommended as especially valuable in pediatric practice by Hochsinger and others—digitalis dialysate and digalen, both of reliable and constant effect; both may be given in milk or other liquids, or if the stomach be intolerant in microclysma.

Regarding the dosage of Golaz's Digitalis Dialysate, Hochsinger recommends 6 to 10 drops *per diem* during the first and second year; in older children 30 to 40 drops *per diem;* this to be continued for a few days only to get the full effect. In cases where digitalis treatment should be continued for longer time, he gives 2 to 3 drops to young children and 10 to 15 drops *per diem* in older children.

In extreme cases of heart failure, either in the early or later stage of diphtheria, scarlet fever or any other infectious disease with weak and indistinct heart sounds, very feeble pulse, labored respiration and attacks of syncope, immediate relief is required and full doses of cardiac stimulants may be given—strychnin, caffein, camphor and whiskey. Sometimes several drugs may be given in combination. Care must be taken that the stomach be not deranged. Camphor is an excellent drug; it rapidly increases the strength of the heart action and is best given hypodermically, in 10 to 20 per cent. solution in ether or sterile olive oil; ether acts even more quickly than camphor, and when quick effect is required ether may be first given and camphor afterward. Strychnin is most useful and very prompt in its action; it should be given hypodermically in doses large enough to produce symptoms of its physiological action; with it caffein may be given, also very valuable in combating weakness of the heart. In order to afford relief to an enfeebled heart muscle and restore the circulation in certain urgent cases when pharmacotherapy fails, we may resort to physical measures of treatment, namely, venesection and hypodermoclysis.

In a group of cases of pulmonary inflammation we have to deal with a weakness principally of the right side of the heart. A small and soft arterial pulse may indicate not so much an inability of the left ventricle as an overcrowded pulmonary circulation. The left side does not receive enough blood from the lungs. The insufficiency of the right ventricle is made evident by cyanosis and deficient peripheric circulation, with cold extremities and impairment of respiration.

As has been pointed out by Dr. A. H. Smith, the use of digitalis at this time will serve to throw more blood into the pulmonary circulation and help paralyze the over-tired right heart. Relief may be attempted by giving nitroglycerin. By its effect upon the vasomotor nerves the blood pressure is lessened and peripheric vessels dilated; thus, the overcrowded lesser circulation may be relieved. Nitroglycerin may be given to a child of one year in the dose of gr. $^1/_{500}$; to one of four years gr. $^1/_{200}$; three or four times until an effect is produced.

These cases call also for the use of oxygen, or, better, a hyper-oxygenated atmosphere, as soon as there is impairment of respiration or, earlier, in the presence of cyanosis.

If, however, circulation cannot be restored by these measures, and life is threatened from paralysis of the heart through overdilatation of the right ventricle, in these extreme cases, as *ultimum refugium*, a vein may be opened for the withdrawal of blood. The euphoria following immediately proves, without doubt, that venesection acts in these cases mainly mechanically, by relieving the impeded circulation; but it will depend on the eventual restoration of the feeble heart muscle whether the relief afforded will be temporary only or permanent.

In an article on "Venesection in Children," Baginsky compares the relief afforded to the overburdened heart and the restoration of the blood passage through the heart and the lungs with the restoration of respiration by tracheotomy and intubation in stenosis of the larynx.

Venesection is again gaining in favor. According to Baginsky, Heubner and others blood-letting may be resorted to in the presence of vital indications, even in the very young, with good results. Most frequently, however, it is indicated in older children in the second half of childhood.

Gregor reported a case from the pediatric clinic in Breslau where venesection was performed on an infant six months old, with double pneumonia and threatening heart insufficiency; the child recovered. The opening of the vein in the young child is somewhat difficult on account of the amount of fat in the subcutaneous tissue, and the small calibre of the cutaneous veins. According to Heubner children will bear the withdrawal of $^1/_{10}$ of the entire blood, which again forms $^1/_{13}$ of the body weight—about $^1/_{130}$ of the body weight.

As another vital indication for venesection in children, Baginsky mentions uremic symptoms, which may occur in the course of nephritis with suppression of urine, delirium, convulsions and coma, with flushed face and high arterial tension. The nitrites may be employed and rectal injections of normal salt solution, but in severe attacks valuable time must not be lost. Baginsky and Heubner recommend blood-letting at that time as a life-saving measure. According to Heubner 100 to 200 grams may be withdrawn in older children; and Schick and Renault advise that the venesection be repeated if the uremic convulsions return. The withdrawn blood may be directly replaced by saline infusions of 100 to 200 grams. The effect on the patient is very marked. The convulsions cease and consciousness returns; the infused saline solution dilutes the poison, relieves the renal congestion, and is a powerful stimulant to kidney secretion.

A few words more on hypodermoclysis—last, but not least—a therapeutic measure of great value, which deserves to be used more frequently in pediatric practice. Our modern text-books on diseases of children hardly mention it at all, or devote *apropos* a few lines to it.

Hypodermoclysis renders toxins circulating in the blood less effective; it supplies much needed water to the system. At times, when it may be impossible to give it per os or per rectum, it stimulates the action of the heart and raises arterial tension. According to the studies of Cohnheim and Gruetzner it stimulates the action of the gastric and salivary glands, and also has a stimulating effect on the action of the kidneys, thus aiding in liberating the system from toxins. Saline infusions are indicated after hemorrhages, such as may occur after ritual circumcision or in typhoid; they are helpful in oliguria, in chronic nephritis, in infantile atrophy, and in the severe form of summer diarrhea, and especially in infants with cholera infantum, with profuse and exhausting evacuations and constant vomiting, with slow circulation and threatening thrombosis. In this condition hypodermoclysis is an excellent and frequently life-saving measure. Nor can we gain the same advantage by giving the solution through mouth or rectum, as the mucosa has at this stage a very limited capacity of absorption. To a French physician, Luton, of Reims, belongs the credit to have first made use of it in the treatment of cholera infantum in 1885. He reported to have saved the life of an unfortunate child by injections of saline solutions. In Germany they were used by Monti in 1887, and he as well as Epstein, Heubner and others reported excellent results.

Heubner injects daily twice 150 c.c. He mentions that he has made as many as 16 to 20 injections in one infant, often with the best results. The fluid for the injection may be a sterile 1 per cent. salt water solution; or, instead, natron chlorat, 5; natron bicarbonic, 5; aqua, 1,000.

ENLARGED TONSILS.—Latent tuberculosis was found in 5 out of 50 cases of enlarged tonsils by Lindt (*Correspondenzblatt für Schweizer Aerzte,* September 15th). He thinks that the tonsils are organs of defense, and if called on for defensive action too frequently they become enlarged. In case of interference with breathing or frequent catarrhs or general symptoms from the enlarged tonsils, their removal is advised under local anesthesia, not forgetting the treatment of anything abnormal found in the adjacent organs. Tuberculosis in the writer's 5 cases was disseminated through the tonsils, and there was no appreciable tuberculous lesion elsewhere except a suspicious staccato respiration in 1 patient, and a complicating middle-ear affection in a boy of four, with a fistula in the mastoid process. The process in the tonsils was entirely latent and no other tuberculous lesion could be discovered.—*Journal of the American Medical Association,* November 16, 1907.

HYDROTHERAPY IN CHILDHOOD.*

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Through modern investigation we are enabled to understand infantile physiology and pathology far better than before, but very little is known of the phenomena which have to be taken into account in applying hydrotherapy to children, and in the little we do know today we are confronted with new problems. If in the past mankind had known that a child reacts to bathing in an entirely different way from that of an adult, the old Spartans and Germans would not have submerged their newborn children in the icy water of their rivers, and our contemporaries would have omitted many erudite paragraphs from their essays.

Hecht published, in 1907, in the *Jahrbuch für Kinderheilkunde*, "Observations on the Effect of Hydriatric Procedures in Measles." His researches throw new light upon many points, and change or corroborate our opinions on some questions in an unexpected way. There is hardly any doubt that his figures hold good, not only in measles, but also in all feverish conditions, and in the healthy. Before I go into details, I shall quote his conclusions, as these will enable us to form a judgment and to thresh out the literature upon the subject so as to separate the grain from the chaff.

Hecht bathed systematically children with measles in half baths of 68° for twelve minutes, with and without friction, inserting into the rectum a long, curved thermometer, which allowed the reading of temperature outside of the water every two minutes during the application of the bath. He found:—

(1) The reduction of temperature is the greater the younger the child. The average during the first year is 6.3°; during the second year 5.9°; during the third and fourth years 3.8°. After this time the reduction more and more corresponds to that of adults.

(2) The poorer the development and the nutrition, the greater the reduction of temperature.

(3) Age is of less importance than development and nutrition.

(4) The reduction of temperature is less dependent upon the height of fever and the amplitude of its daily variation than in adults.

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* Read before the Section on Pediatrics, New York Academy of Medicine, February 13, 1908.

(5) Friction during the bath, and the addition of mustard, influences the effect less than in adults.

(6) After the procedure the reduction is nearly the same as during the bath, contrary to the figures in adults, in whom it is merely a few tenths of a degree.

(7) Shivering does not occur so remarkably as in adults, but crying may replace these involuntary clonuses.

(8) The pulse rate and respiration are lowered more than in adults.

(9) The reduction of temperature is the greater the higher the vasomotor excitability.

From these facts Hecht concludes that the physical regulation of heat in the child is insufficient. In the newborn it was known long ago. Andral thought that the change to the condition of the adult took place during the second hour; Schütz and Eröss, during the second week; Löschner, during the second month, and Demme, during the twelfth month. Hecht corroborates Sturges's supposition that the whole state of earlier childhood is altogether different from that of the adult.

Rubner has shown that the surface of a child is in inverse proportion to its weight. A baby of 4 kg. has 3,000 cm². of surface; 12 kg. correspond to 7,200 cm²., and 16 kg. to 7,700 cm². According to the relatively larger surface the effect of bathing is more pronounced, and for this reason the hydrotherapeutist would reduce the duration of the bath. However, that this proportion does not explain the fact fully has already been mentioned by Raudnitz. Possibly one of the reasons is the fact that the rapidity of metabolism of the child is so high that it cannot be increased any more, and another reason may be found in the phenomenon elucidated by Arnheim, that the loss of heat from the skin by conduction, radiation and evaporation is much greater in a baby than in an adult, probably because the infantile skin is softer and thinner.

Let us now draw practical inferences from these researches. I believe we may say unanimously: It is wrong to apply extremely low temperatures in childhood. I do not hesitate to call Hecht's 68° for a child extreme. It acts more strongly than even the severest Brand bath in adults. Do not do to others what you do not wish them to do to you. The child's bath should be 10°, and often 15°, warmer than in a corresponding condition of an adult, and it will have the same effect, according to the different physiological circumstances. Where there are wide limits in a hydriatric prescription, as a rule the milder degree is to be preferred, as long as the case does not require a stronger proceeding. Besides, the duration of the application should be as short as is possible without spoiling the result. Of course, in severe cases, a heroic proceeding may be inevitable.

Coming now to details, we have to deal, first, with the question of hardening. From the most remote antiquity down to our overwise times, the most heroic procedures have found their advocates. Kneipp, the King of Quacks, recommended submersion in water of 60° for a few seconds up to one minute. But warning voices have increased in number, and the question was raised anew by Hecker a few years ago. He had ample opportunity of studying the deleterious results of extreme bathing in the immediate vicinity of Rev. Kneipp, and he showed that nervousness, irascibility, restless sleep, anemia, increased liability to catch cold, catarrhs of the upper air passages and the digestive tract could be found very often in children presumed to be hardened. I think it is useful to state here, that not only cold water bathing is objectionable, but also air baths and thin dressing, if done to excess. Although we have a number of theories about colds, it seems to me that none is entirely satisfactory. There is a retention theory, a reflex theory, and one that supposes circulatory changes. Possibly they all are right. However it may be, I think we can accomplish more good if we discard the hardening idea entirely and put the question so: How can we obtain the best condition of children to combat sickening influences? If we prepare the body for all eventualities possible, then there seems to be no doubt that we also enable the body to successfully withstand the influences which cause a cold. Here let us call to mind the fact that hydrotherapy offers a powerful weapon to grant a lively circulation or to correct an impaired one, that it grants thus uniformity of blood composition in all parts, preventing stagnation, firstly, in the blood forming organs, thus favoring blood formation; secondly, in the secretory and excretory glands, thus providing these organs with the best material possible to enable them to perform their function; thirdly, in the whole nervous system, thus securing proper innervation. The nervous system certainly will be stimulated also by the immediate effect upon the end apparatus.

Of all hydrotherapeutic procedures only the rub and the bath with or without affusion can be used; affusion is effective only if it is given with high pressure or low temperature. The first is a very inconvenient affair, as it wets the whole surroundings. Low degrees are objectionable. Furthermore, affusion is always an unpleasant procedure, and I never saw a child pleased by it. For this reason I resort to affusion only in pathological cases, where brain symptoms or defective breathing are under consideration. Finally, it seems to me that affusion is only the result of the old hardening idea to have a contrast effect, which was thought to be obtainable only in this way. After Hecht's researches we know that even the higher degrees act upon the child as strongly as lower degrees would do upon adults; that they must have, consequently, a tonic effect. Indeed, a temperature of 97°-88°-86°, which is called indifferent and neutral in adults, is not indifferent in children, but when applied for a somewhat longer time increases decidedly the loss of heat and may cause, as Hecker showed, very unwelcome conditions. In short, low degrees have to be avoided entirely. From 97° to 86° will act upon a child exactly as 90° to 75° upon an adult. And in accordance with this most writers recommend during the first year 95°, during the warm season 91°, and some go down to 86°. My own advice in average cases is to bathe the newborn at 97°, after four weeks 96°, during the third month 95°; every month 1° less till 88°. During the second year I used to lower the temperature gradually to 84°, but I never transgress 80°, even in healthy children. During the first five or six years in poorly nourished ones the progress has to be slower. The duration of the bath should be from three to eight, and seldom ten, minutes. The strong baby stays in the water longer, the delicate one shorter. During the bath the child should be washed during the first year with a sponge, later with a soft linen mitten; later this may be of rougher material. Mostly, I advise to bathe morning *and* night, or to substitute one bath by a wash with a sponge, linen mitten, or later with a rougher material, the temperature of the water being 90° to 80°, *i.e.*, a little cooler than the water in the tub. In this way I begin to harden, to use this word once, my children from the day the cord is fallen off. Development and nutrition, the season, the condition of the room and time and possibilities of the home are constantly guiding me regarding the details in the hydrotherapeutic line of hygiene.

Coming now to the treatment of infantile diseases, I refer to the recently published work of Zappert: "Die Physikalische Therapie des Kindesalters." Though it is by no means perfect, it is altogether a very diligent compilation of the older literature relative to the subject. In order to prevent repetition, we shall first dwell upon the treatment of feverish conditions in general; and in doing so we shall slip in such peculiarities as may be offered by the various infectious diseases. Then we will deal with the maladies of the organs, and finally add, without strict order and connection, a number of affections that yield especially good results when treated by hydrotherapeutics.

Regarding hydrotherapy in fevers, there is no doubt that the struggle of the hydrotherapeutists for more than a century has begun to bear fruit. Nothing illustrates the triumph of hydrotherapy so obviously as the fact that nearly all authors are conscious of the doctrine that not the reduction of temperature itself, the antipyresis, is the goal of our proceeding, but the effect upon the whole economy to help it to overcome the disease.

The whole nervous system should be stimulated directly, the activity of the skin as the great regulator of heat and metabolism should be as normal as possible, or increased even when compared with the normal. The glands should be exacerbated to the highest amount of working possible and the circulation should be favored as far as possible. In short, when I compare the economy to a machine, this machine should be enabled to work as smoothly as possible at the highest speed. For this reason we bathe not only when the infection has reached its acme, but we do not even wait for this moment; we intend to force the disease to stay on a low level; we intend to urge the disease to run its course as mildly as possible. Furthermore, we purpose the disease to run its course without deviating from its path, scientifically speaking, to prevent complications. To illustrate the hydrotherapeutist's aim, let me only recall facts as these: It has been demonstrated by the microscope that the accelerated circulation does not allow the development of the known picture of inflammation in an infected tissue. This heals without accumulation of white corpuscles. The demonstration was made by infecting the skin of an animal. Experience has demonstrated the fact a hundred times that the same happens as in the development of bronchopneumonia from bronchitis. Another fact: the urotoxic coefficient of urine during a bathing period in typhoid is higher than without bathing during the disease and lower during convalescence.

In the unbathed it is the reverse. Third: Sweat produced by physical means (bathing) contains more toxic substances than that produced by drugs. Fourth: Bathing causes a leukocytosis and an increased loss of water from the skin. Fifth: Blood alkalinity is augmented. By what drug can equal results be obtained? Regarding the procedures, we may avail ourselves of the rub, the bath, the wet pack and cold compresses. According to the age, a sponge is used, a linen mitten, or a rougher material, to give the rub or friction. It may be done, according to the case, two or three times a day, or it may be repeated several times in succession during one hour. There is absolutely no contraindication to rub a measles or scarlet fever skin, but it is self-evident that we should not do it in the pustule-forming stage of small-pox. In mild cases of the common infections, as measles, scarlatina, diphtheria, or mild diseases, as rubeola or varicella, the cold rub alone will be sufficient. In the severer diseases, as infantile paralysis, typhoid, meningitis epidemica, acute rheumatism, and in the severe cases of the more harmless diseases, it is given between other applications, and in the beginning of the water treatment to measure the vasomotor excitability, according to which we will dose the following applications. The procedure most used is the half bath; that means a bath that covers only about one-half of the body, combined with more or less vigorous friction. The full bath does not allow of proper friction. In babies the friction must be mild; the more virulent the infection the more vigorous the friction. The number of baths is two a day up to as many as the case requires. In mild cases two, for instance in scarlatina, measles, gastroenteritis, diphtheria (the use of antitoxin is self-evident), typhoid, and others. During the first days of measles and scarlet fever one bath may be given in the forenoon, one between four to seven, and one between nine to twelve o'clock P.M. In typhus, or severe cases of other fevers, quite a number may become necessary; the general aspect and the thermometer may guide our proceeding.

The duration of the bath is the shorter the younger the child and the milder the malaise; it may range between three to twelve minutes; in extreme cases even more.

The temperature should be according to the light thrown by Hecht; of course lower than for hygienic purposes, as detailed before. But I must repeat here, where there is a wider limit in the prescription the milder should be tried first. If, for instance, the advice of the text-book is 88° to 75°, take 88° first. You will earn the thanks of the parents as well as of the patient, and when the effect is not quite satisfactory you may go on more strongly. In the majority of cases 86° to 80° will prove sufficient. So far as I remember, I never prescribed less than 70°. And this was done in a number of hyperpyretic scarlatina cases. I prefer to give rather a few baths more. After the tub we may dry the patient, or, better, wrap him in a (sometimes warmed) dry linen sheet and bring him so to bed. If there are brain symptoms, or asphyxial conditions in the lungs, affusion may be combined with the bath.

These are the details reported by Zappert from the literature, as advised in measles, diphtheria and scarlatina by Ziemssen, Buxbaum, Winternitz, Monti, Henoch, Biedert, Heubner and others.

But not only these infections can be treated in this way. Indeed, any other disease, as pertussis, acute rheumatism, infantile paralysis, small-pox, and gastroenteritis, offers the very same indication, provided that the location and intensity of pain in arthritis or the pustulous stage of small-pox do not forbid the mechanical irritation inevitable from bathing.

Zappert does not mention the use of the hot full bath, 107°, though the reports increase in number.* It is given either so that the baby is slowly immersed for three minutes without rubbing, or the water is first 100° to 103° warm, the child is put in, and after one minute hot water is added up to 107°. During the first year three minutes are sufficient; later on four to six minutes should not be exceeded. This bath is highly advisable in pending collapse, for instance, of summer cholera, to promote the appearance of the rash in exanthemata, and, last but not least, in cerebrospinal meningitis, here repeated many times during the day. It may be useful to state that this bath is a wonderful stimulant. Protracted baths, less hot, are positively less stimulating and may prove fatal. Moderate fever is no contraindication, as in such the bath is effectively antipyretic.

Next to the tub bath the wet pack has to be mentioned. Changed four to six times during an hour, it may act as a reliable antipyretic (scarlatina). When allowed to remain for an hour its effect quite resembles that of a moderately dosed half bath.

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* For further details see Grosse: "The Hot Full Bath" in the *Medical Record*, 1904, No. 9, p. 326.

This method is recommended by numerous authors in measles, scarlatina, bronchitis and bronchopneumonia. When given longer, so that perspiration is reached, it may be warmly recommended in diphtheria. All wet packs are followed by a cold rub or, better, a half bath. For the pustulous stage of small-pox it is recommended to apply the compress thinly covered for a time, not sufficient to become hot, and then to renew it without rubs and baths.

Finally, the cold compress: Linen towels well wrung out of water at about 70° are wrapped around the trunk three or four times and well covered with a dry permeable material. Impermeable material is positively forbidden. Duration, when a cooling effect is wanted, very short. When stimulation is looked for, the general aspect of the patient decides the time to renew it—one to four hours. Its physiological effect is stimulation of the skin activity, revulsion of the circulation, unburdening of inner organs and acceleration of the blood flow in them (brain, chest, abdomen), and calming of the nervous system. It can be applied alone or between the rubs and baths. Indeed, the hydrotherapeutist keeps it around nearly every patient from the beginning to the end of the disease.

In closing this paragraph, it is certainly not saying too much if we state that the results of hydrotherapy are splendid; that water-treated patients look generally better; that the disease runs shorter, milder; that complications are more easily prevented, and that convalescence is shorter.

Coming now to the treatment of the organs, I shall mention only what is not covered by the general treatment outlined before.

In acute rhinitis and all forms of coughs, in my opinion, the Bälz bath of 107°, as mentioned before, is an almost sovereign remedy when given three times in thirty-six hours. The child is afterward not dried, but wrapped loosely in a dry sheet and brought to bed until the following perspiration has ceased. The procedure is by no means weakening. In stenotic conditions of pseudocroup, measles, pertussiss, it is without doubt of absolute efficacy. In pertussis I advise, during the first more feverish days, the general treatment; later on I bathe regularly morning and night, apply compresses over night, and give twice a week three hot baths in thirty-six hours. The results urge me to emphasize this management decidedly. I know of no other kind of treatment that yields equal results in diseases of this group.

As to the heart, I need only mention that a rationally conducted general treatment is a valuable adjuvant to pharmacotherapy. Effervescent baths are also recommended in children.

Regarding nephritis the Bälz bath must be recommended again. It can be repeated as often as the case requires, but it must be hot and short. One short instance will illustrate this. A scarlatina child was suffering from nephritis with general dropsy. The house and consulting physician advised "hot bathing" as long as possible. After a few days the lethal end seemed to be inevitable. My recipe was 107° three minutes five times daily. The result, recovery. The "hot bathing" was done for twenty minutes positively less than 107°. Another procedure of approved efficacy is the sand bath, a handy application for home treatment. Here dry sand is warmed to 95°, later to 110° and up to 130°; spread upon a bed sheet about four inches thick, the patient wrapped in as in a wet pack. The procedure is well tolerated, and followed by a rub or half bath. The same proceeding would be indicated to promote resorption of exudates of any kind after the inflammatory period is over.

Here may be the place to slip in a few words on the treatment of enuresis nocturna. Provided that there is only a nervous or muscular weakness, a hip bath of 75° to 70° may be given two to three times daily for eight or ten minutes. If the little patient does not allow it, one may get him used to the procedure by a number of warm hip baths, which are gradually lowered in temperature.

Paralysis after diphtheria, or infantile spine disease of the anterior root, require wet sweat packs followed by half baths, or Bälz baths, with a general stimulating proceeding.

Cramps of any origin, except, of course, tetanus, are a thankful field for hydrotherapy, according to Zappert's compilation. If fever is present, cold rubs, frequently changed compresses, or half baths, with or without aromatic addition, are recommended; further prolonged warm baths (97° to 93°), gradually cooled down. If fever is absent, dry friction, cold compresses around the head, half baths of 86° to 80°, hot wet packs and prolonged baths are mentioned. I would add that in all cases a hot full bath is preferable, and, in my experience, absolutely reliable for the attack. The after treatment depends upon the cause of the spasms.

In cholera, Buxbaum gives half baths of 86° to 80°, wet packs forty-five to sixty minutes, combined with the spine cooler.

Gowers and Huber advocate baths of 93° to 100°, with wet pack following, until the patient perspires, and half baths once or twice daily.

Diseases of the digestive tract offer ample indications for the use of water. Acute gastroenteritis has been skimmed over already. In all cases a compress will favor circulation in the depth and cover at the same time a host of minor symptoms. Barwinsky and Rosenberg recommended in catarrhal jaundice two daily enemas of 1 pint of water at 60°. The water is to remain from one to three minutes, and it is often necessary to close the anus with the thumb. I have seen only good results and would accept no other advice.

Atonic obstipation requires small cool injections, hip baths of 75° for three to eight minutes, and half baths, the spastic form, large, warm enemas without pressure, warm compresses, or a 107° full bath.

I would regard my article unfinished if I did not mention that hydrotherapy is, unfortunately, badly neglected in the management of our summer complaints and chronic digestive disorders. There is no other agent always so ready at hand as a half bath. Since recent researches have revealed the fact that what was taken for heart failure in collapses is more due to vasomotor insufficiency in the skin than to that of the heart, we readily understand that water must stimulate the succumbing system effectively, if we apply the right degree. Indeed, there is hardly any doubt that rational frequent bathing is the best prophylactic. And even in a perfect collapse a hot full bath of from one to three minutes' duration has often proved life-saving. Remarks on bathing should not be omitted in the instructions to our district doctors for the poor. They are just as important as the dietetic part.

In all cases of faulty metabolism, as scrofulosis, anemia, rhachitis, frequent bathing, as detailed in the hygienic part, yields better results than drugging alone. One or two times a week a wet sweat pack or a Bälz bath slipped in between the regular bathing will seldom disappoint.

Whoever will devote a little of his time to the study of hydrotherapy, and will keep in mind the advice that no hydriatric proceeding is possible without thermometer and watch, that is, without the minutest exactness, will soon be convinced that hydrotherapy in childhood cannot be appreciated too highly.

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THE USE OF ANALGESICS IN PEDIATRIC PRACTICE.*

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It would be difficult to select any therapeutic agent which did not at some time and under favoring conditions relieve pain. This occasional property cannot, however, be taken as indicating that that particular agent is an analgesic—it simply possesses analgesic properties at the time. We have, however, at our command certain agents which are more or less constant in their action against pain, and although this may not be their chief or their only effect, still it is such that, by common consent, they are classed as analgesics.

In this paper there will be considered only such agents as are commonly accepted and used as analgesics.

Analgesics in pediatric practice have at once a very limited and, at the same time, an extensive field of usefulness. This apparently contradictory statement will be made clear as we further take up the subject.

It may be well to arbitrarily divide the subject into three sections—external, local and internal analgesics. Under the *external analgesics* we include the following:—

Counterirritation.—It is of great importance to know just how to place the counterirritant so that it will have the greatest analgesic effect. Clinically it has been repeatedly demonstrated that the revulsant must be placed directly over the organ or part when the condition causing the pain is deep-seated. When a superficial part is affected and that part is supplied by the anterior branches of a spinal nerve, the counterirritant must be placed over the posterior roots of the nerve. Mild counterirritation is useful in infants, but blisters must be used only in older children, and not in them when the arterial tension is high or the vitality low.

Galvanism.—The certainty with which galvanism will relieve the pain of neuralgia is indisputable. And in those conditions in which there is a marked muscular spasm with pain (as in many cases of wry-neck), the relief afforded is immediate and marked. Galvanism seems, however, to fail in one form of neuralgia—that of the fifth nerve—in which the pain is intense at night. But in these cases the iodids afford marked relief.

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* Read before Section on Pediatrics, New York Academy of Medicine, February 13, 1908.

Heat.—The topical application of heat gives much relief from pain in sprains, acute articular rheumatism, torticollis, pleurisy and colic. In earache and painful conditions in the throat, its use in the form of a douche or gargle will afford much comfort. It is a means of relief too often neglected as being too simple.

Cold.—The proper application of cold compresses is a marked pain reliever in many conditions. The pain from an adenitis, appendicitis, congestive headache, acute pharyngitis, tonsillitis, and many similar conditions is lessened or entirely relieved by the judicious application of cold.

Infiltration.—Injection into the skin itself is very closely allied to the more commonly practiced subcutaneous injection. But in the cases in which it can be used it has a distinct advantage in that added to the local effect of the agent used there is the effect of pressure on the nerve endings. This allows of the use of less of the anesthetic. While its use is restricted, even the injection of warm normal salt solution into the skin will bring much relief from a localized pain, or allow a simple operation to be painlessly performed.

Acupuncture.—This procedure has a very restricted use, but must be thought of in those occasional deep-seated neuralgias which yield to no other treatment.

Aquapuncture.—The injection of water directly about a superficial nerve will prove analgesic. This is its only apparent effect, except in those cases in which some of the water is injected directly into muscular tissue and in this latter instance if the muscle be atrophied or paralyzed, its nutrition is improved.

Emollients.—These have a mechanical action, but in addition they seem to exert a dynamic influence upon the nutrition of the parts. Provided that great care is used in the selection of their fatty base, emollients are direct analgesics in painful conditions of the cutaneous surface.

Of the agents used for local relief of pain, cocain stands at the head. The use of this agent and also ether, chloroform, alcohol, ethyl chlorid, menthol, phenol and dilute hydrocyanic acid are so well known that we need not discuss them further.

Under *internal analgesics* we will include all agents not already considered, and which have a general effect irrespective of the manner of their administration. For the sake of conciseness and practicability they will be considered according to their therapeutic indications.

When one is confronted with the demand for the use of an analgesic, there are two considerations which must be disposed of at once—(1) the type of the effect desired and (2) the contraindications to the use of the agent.

When a quick but short action is desired we have recourse to the use of the general anesthetics and cocain.

The indications, proper administration and dangers of inhalations of chloroform, ether, the A.C.E. mixture, nitrous oxid gas and ethyl bromid or chlorid are too well known to permit of discussion here.

In those rare instances in which a general anesthetic is indicated but its use forbidden, we may use a combination of three grains each of chloral and urethan triturated together, after which $^1/_{12}$ grain of cocain may be added. Such a combination will give great relief, but its use is attended with danger.

When a rapid and lasting effect is demanded there is nothing which will act as promptly or as certainly in the relief of pain as the opiates. The fact that the use of opium in children has been much abused in no way detracts from its value. It is always necessary to remember that all children bear opiates badly and that they are peculiarly susceptible to their toxic effects.

The opiates have a large field of usefulness in children if the selection is wisely made, the action carefully watched and the dose made small enough.

My own plan is this: Start with the old rule of our college days that the proper dose for a child is the adult dose divided by the age of the child in years plus 12. With the opiates I divide this result by 2—then again by 2, and the result is a safe dose.

When the agent is used simply as an analgesic, the best effects are obtained by the administration of morphin. As the analgesic effect of morphin is greatly increased by the addition of atropin and the after-effects of the drug are less objectionable if atropin is added in a quantity sufficient to establish a physiological balance in the cerebrum, the combination is best.

When in addition to pain there is a marked restlessness present, the addition of hyoscin hydrochlorate in minute dosage (as $^1/_{4000}$ grain for a child of five) will markedly intensify and prolong the action of the morphin.

Excepting the general anesthetics, there is no agent that is the peer of opium in the relief of all kinds of pain, with the one exception of acute inflammation of the brain.

The use of codein in my hands has not been entirely satisfactory. To obtain any results, proportionately large doses must be used. During the administration of such doses there frequently has occurred the sudden appearance of toxic symptoms. These could only be explained upon the basis that the drug was adulterated with morphin or had in itself the power of cumulative action. Either of these renders its use uncertain and therefore not without danger.

Heroin is certainly very inferior to either morphin or codein, except in one particular. In painful coughs it is the equal of morphin and has the distinct advantage of not arresting the secretions.

The contraindications to the use of the opiates are an increased reflex irritability.

Chloral Hydrate.—In the moderate, and therefore the safe, doses, the most prominent and constant effect of chloral is sleep. In the mild degrees of this sleep there is no anesthesia.

That chloral will relieve pain we do not dispute, but the dose which must be given to produce the effect must be so large that it is dangerous. Chloral does not directly affect the motor nerves or impair muscular contractility, so that the paralytic effect must be by its direct effect upon the nerve centres. The uncertainty with which any given dose will act renders it peculiarly unsafe as an analgesic. As an adjunct to cocain or morphin it is useful, heightening their analgesic effects.

Chloral has a marked tendency to irritate the gastrointestinal tract, and this renders it peculiarly harmful in infants and young children. During the early period of life, analgesics and many other agents given to the child disturb its digestion to such an extent that the conditions caused thereby are worse than the original condition for which the drugs were used. In early life the physician's most valuable aid to the giving of drugs is a perfect digestion in the child.

The contraindications to the use of chloral are medullary depression, valvular disease, or any serious or chronic disease of the kidneys, lungs or stomach.

Antipyrin.—Antipyrin has a very decided use in the relief of pain, but it is not free from danger, and the profound depression and collapse which often attend its use in children make it a drug that must be carefully given and watched. If one constantly bears in mind the possible untoward effects, we have at hand one of the most certain and powerful analgesics. It seems reasonably certain that the greatest relief is afforded when pain is dependent upon a rheumatic condition or the rheumatic diathesis is present. This also lessens its value in children because children with a rheumatic diathesis are usually the subjects of cardiac changes which make that organ more easily depressed.

The chief use of antipyrin is in those cases where the pain is caused by some central or peripheral lesion of the nerve apparatus. It does not irritate the digestive tract and seems rather to increase than decrease the appetite.

In a large clinical experience one will find that the property of antipyrin to relieve pain is very much lessened when the pain is of the ordinary inflammatory type and under these conditions it is much the inferior of the opiates.

Acetanilid has the same indications as an analgesic, and is accompanied with similar dangers in its administration to those of antipyrin. In both of these the elimination takes place rather rapidly, and is at its height in three hours.

The contraindications to their use are an exhausted condition or the presence of cardiac disease.

Phenacetin has a parallel therapy as an analgesic with antipyrin and acetanilid, but being far less dangerous to use, it must, in pediatric practice, remain the drug of selection. Its full effect is delayed more than the others and it is four to six hours before the full extent of its action is determined. It is important to remember this in its use as an analgesic.

Exalgin is about five times more powerful as an analgesic than is phenacetin, but its action is also about five times as inconstant, and this renders it unsafe for use.

Chloralose is also of very uncertain action, and may be attended with complete unconsciousness, cyanosis, involuntary discharge of urine, persistent vomiting and a slow, weak pulse. As these may be present even when very small doses are given, it is a dangerous analgesic.

Croton chloral is on about a par with chloral hydrate, and what was said of one will cover the other.

Cannabis Indica is of practically no use as an analgesic, its place being better taken by the opiates and with more certainty of action.

Pyramidon and phenocoll are so inferior to phenacetin that they need not be considered.

When a weak but prolonged action is demanded we have several analgesics.

Aspirin, one of the salicylate group, has a weak but prolonged effect. Its chief indication is in those cases in which the salicylates are beneficial and after the acute pain has been relieved by other measures.

Chloralmid takes several hours to act, but the analgesic effect once produced is very prolonged although weak.

Chloretone is closely allied to cocain as a local analgesic. Its action under other conditions is weak, slow and uncertain, although it is rarely if ever actively toxic.

When a weak and short action is required the bromides act well. Bromides are chiefly indicated when the irritable state of the nervous system dominates the other influences. They act by depression of active brain cells and are weak but safe to use.

Bromoform is closely analogous to the bromides in therapy as an analgesic, but is slightly toxic.

Alcohol relieves pain when a large enough dose is given to produce a mild intoxication, but the effects of such a dose upon an unstable and developing nervous system and upon the morals of a child outweighs its possible beneficial effect.

The antispasmodics are of feeble power as analgesics with one exception—Hoffman's anodyne. They are indicated in those conditions of weakness in which the nerve centres become much more susceptible to external influences than is normal.

Hoffman's anodyne acts chiefly because of its combination of ether and alcohol.

Lupulin has an analgesic effect more imagined than real.

Lactucarium and stryptcin are too feeble to use at all.

Narcotin, cotarnin and narcein have all failed to do what was claimed for them.

In summarizing, therefore, we find that analgesics have a very restricted use in pediatric practice, because there are so few of them that are not dangerous to use during childhood.

On the other hand, they have a wide field of usefulness, because children do not bear pain well; they bear it patiently, but its physical effects are proportionately great.

There are some things that have been well demonstrated in regard to analgesics and their administration during childhood:—

(1) They are all more or less transient in their effect, except in the case of a very few of the weakest ones.

(2) They are all more or less objectionable.

(*a*) Because of the liability to the formation of the drug habit.

(*b*) Because of the irreparable damage done to a developing nervous system when their use is prolonged.

(*c*) Because of the dangers of overdosage.

(*d*) Because of the irritant effect which most of them possess.

There are also some well-defined rules in their administration:—

(1) They must be given only when absolutely necessary and after a careful consideration of the relief which might be obtained by their external and local use rather than the internal administration.

(2) They must not be given at such a time or in such a manner as to obscure the diagnosis.

(3) The cause of the pain must be removed whenever possible before the internal administration of an analgesic.

(4) The dose should be very small at first, and for three reasons:—

(*a*) The child may be susceptible to the drug used.

(*b*) Relief may be obtained by the first dose, and relief from pain in a child once established tends to continue.

(*c*) The opportunity is offered for an increase in the dose later on if the demand arises.

(5) Any one agent must not be used for a long time, but a change must be made from time to time to avoid tolerance and habit.

(6) The dose should be small and frequently repeated instead of an initial large dose.

Clinical Memoranda.

LYMPHOCYTOSIS AND LEUKOPENIA IN DIPHTHERIA.—WITH REPORT OF A CASE.

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Diphtheria generally presents a leukocytosis as one of its general symptoms. In 90 per cent. of diphtheritic cases the leukocytosis varies from 15,000 to 30,000. The leukocytosis may reach 75,000. The leukocytes begin to increase early in the disease. They reach their height within the first three days. Thereafter they diminish as the toxemia subsides. A continued progressively high leukocytosis marks a poor prognosis.

There is no relation between the leukocytosis and the extent of membrane, degree of glandular involvement or height of the fever. The increase of the leukocytes is, however, a rough indication of the degree of reaction to the toxic products.

The leukocytosis usually results from a relative and absolute increase of the polynuclear neutrophiles. The increase of the neutrophiles is moderate in children, seldom reaching higher than 85 per cent. This is probably due to the tendency of the blood of children to revert to the infantile type of blood when lymphocytes predominate. Diphtheria in children not infrequently exhibits a lymphocytosis instead of an increase of the polynuclear neutrophiles. Ehrlich regards such a lymphocytosis as due to the mechanical expression of lymphocytes from the enlarged lymph glands. This position is not wholly tenable, as marked leukocytoses with 60 per cent. to 70 per cent. of lymphocytes have been reported in cases of diphtheria in which no enlarged lymph glands could be demonstrated. There may be at times a lymphocytosis with actual leukopenia instead of leukocytosis. In this type, the lymphocytosis may be absolute as well as relative.

Lymphocytosis in children is a physiological reaction, apparently, in many conditions, as pertussis, mumps, syphilis, rachitis, etc. It is quite possible to explain the appearance of absolute lymphocytosis on the basis of chemotaxis. Relative lymphocytosis may be partially accounted for by a destruction and agenesis of the polynuclear neutrophiles. This is best evidenced in cases of leukopenia with relative lymphocytosis. Much is to be said in favor of Holmes's contention that the potential resisting power of patients is best evidenced by the increased proportions of the lymphocytes. Certainly the power of resistance in children is most marked, and in continued disease lymphocytosis is most commonly found.

Leukopenia in diphtheria is most frequently regarded as an evidence of low resistance. Many observers, therefore, regard leukopenia as a significant factor in determining an unfavorable prognosis. When the leukopenia is accompanied by lymphocytosis, the prognosis is regarded as still more fatal. Large percentages of lymphocytes have been noted with sufficient frequency to create especial comment. Felsenthal has claimed that the blood in diphtheria takes the form of true leukemia. Bouchut also has termed the blood leukemic.

The leukemic appearance of the blood in diphtheria is accentuated by the common appearance of myelocytes. They may be present up to 20 per cent. in the blood of diphtheritics. The presence of myelocytes in marked percentages—above 2 per cent. —usually betokens a grave prognosis (Engel).

Eosinophiles are usually reduced in number, but persist. High percentages of eosinophiles offer a favorable prognosis.

In connection with the case to be reported, it is important to recall that the average percentage of lymphocytes for children at one year is 54 per cent., and at three years is 43 per cent. Fifty per cent. would be about a normal average for children of nineteen months. The average leukocytosis at nineteen months would be about 12,000.

F. M. (by courtesy of Dr. R. Stern), *æt.* nineteen months. Lip swollen, covered with slight grayish membrane—bleeds easily on removal of membrane. Fauces red, but without membrane. Submaxillary and sublingual glands very slightly enlarged. Culture from lip showed B. diphtheriæ.

The following blood counts were made:—

	2d day.	3d day.	4th day.	5th day.
Total leukocyte count	6,000	7,600	10,400	8,000
Lymphocytes	89%	86 %	74 %	65 %
Polynuclear neutrophiles	6%	11 %	21 %	30 %
" eosinophiles	1%	1.5%	3.5%	4 %
" basophiles	4%	0 %	.5%	1 %
Myelocytes	0%	1.5%	1 %	0 %

Temperature on the second day was 102° F., and reached the normal on the fifth day. Recovery was uneventful. The smears showed the marked polychromasia and poor staining qualities of the polynuclear neutrophiles that are so marked in the blood of diphtheria. The increasing eosinophiles with low myelemia bespoke a favorable prognosis despite the high lymphocytosis and leukopenia.

THE SO-CALLED SCHOOL ANEMIA.—Unruh (*Deutsch. Med. Woch.*, Vol. XXXII., No. 41) ascribes to myocarditis, albuminuria or hypoplasia of the heart and large vessels a large proportion of the disturbances which are generally attributed to school anemia. He believes that myocarditis occurs much more frequently than is generally recognized, not only after diphtheria and scarlet fever, but after other infections, even mild tonsillitis. The relics of the myocarditic process may persist for years; the tendency to myocarditis seems to increase with age. In albuminuria the child need not be kept out of school, but it must be remembered that muscular exercise is far more liable to arouse a not quite healed albuminuria or to cause a relapse than dietetic errors. Girls are affected more frequently than boys, and puberty is the age generally noted. The school can scarcely be incriminated in this form of albuminuria; treatment requires great circumspection, although not necessarily excluding the child from school. Hypoplasia of the heart and large vessels is a transient disturbance in growth, more common in boys, and most frequent about the seventh and eleventh years. In regard to sports and exercise, anemic and chlorotic children, myocarditic heart muscles and the conditions due to transient defective development, all require to be guarded from physical strain. Such children should not be allowed to share in the swimming, bicycling, tennis playing and gymnastics of the others. They do not need exercise, they need to be spared, and the physician in deciding when the child can join again in the sports of his mates should not allow himself to be influenced by the child's will and subjective feelings, nor by the opinion of the parents or the wishes of the other scholars. Every case of so-called school anemia requires careful examination, especially of the heart. The child's heart does not possess the tolerance generally ascribed to it; as a rule, the heart is extremely sensitive during childhood. Fortunately it recuperates readily under the appropriate diagnosis and treatment, above all when it is spared unnecessary exercise and strain.—*Journal of American Medical Association.*

A CASE OF CONGENITAL DISLOCATION OF THE PATELLA.

BY DE RUYTER HOWLAND, M.D.,
Stratford, Conn.

The patient was a newborn male child, born after an easy labor, February 15, 1907. While making the usual examination of the child to ascertain the presence or absence of deformities, I noticed that the right knee was "double jointed" and could be bent as far forward as backward. When the child lay in the crib the leg would be overextended so that it was at an angle of about 45° with the thigh.

For two days it was impossible to locate the patella. Then it was found lying below the external condyle of the femur, and was replaced to the normal position with but little difficulty. The leg was put up in a circular plaster bandage and left there for three days. It was then released from restraint, the patella showed no sign of slipping back to its old position and the child held the limb flexed in the normal posture, but seemed to be in pain when any attempt was made to overextend the leg. At the present date there is no sign of the deformity.

GOITER IN THE NEWBORN.—Plauchu and Richard (*Gazette des Hôpitaux,* May 11, 1907) say that goiter may be congenital and hereditary in newborn infants, and is a very grave disease. The symptoms are cyanosis, dyspnea from compression of the trachea, cough, and difficulty in deglutition from pressure on the esophagus. The dyspnea may be so severe as to require inversion of the child to relieve it, or tracheotomy. The tumor extends across the neck, or forms two pyramids with the apices upward and backward. There are three forms. The parenchymatous is rare, there being only one autopsy recorded. The vascular is most common. It consists of much dilated veins, which form large sinuses, with a small amount of tissue surrounding them. This form is generally gradually absorbed. The cystic also occurs. Treatment in severe forms is operative, exothyropexy being preferred. Thyroidectomy is too severe an operation to perform in the infant.—*Medical Record.*

ARCHIVES OF PEDIATRICS.

MAY, 1908.

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THE DISPENSARY PHYSICIAN AND THE INFANTILE MORTALITY OF SUMMER.

It is now the time of the year when the cases which are presented to the children's dispensaries have begun to change in character and to warn us that in a month, or at best six weeks, we shall be again face to face with the old problem of summer diarrhea and its infant mortality. The cases of colds, of bronchitis, of pneumonia are fewer, the epidemics of measles and of scarlet fever are beginning to wane, and the running ears are drying up. The cases of improper feeding, which come whatever be the season, take on a new significance from the occasional case of enterocolitis; and we realize that these same difficult feeders will be the first to succumb to "summer complaint."

June, July, August, and the first part of September mean for the dispensary children much sickness and many deaths.

In these three and a half months the total death rate rises to a point as high as, and usually higher than, at any corresponding period during the year. The ratio between the total deaths and the deaths under one year, which in winter (December to March) is about 6.1 to 4, during this time is about 5.1 to 4, while the absolute death rate in infants rises above the average total death rate of the winter months. Of these deaths under one year, enterocolitis is responsible for 62.5 per cent. during the winter, while in the middle of August it causes nearly 85 per cent.; and the absolute number of deaths has practically doubled. These facts should teach us, did we not already know it too well, the importance of infantile summer diarrhea.

Now, to the dispensary physician this comes home with peculiar emphasis, because the patients he sees come from the homes of the poor and of the destitute, where they are exposed to all the deleterious effects of dirt, noise, poverty, ignorance and disease. To the mortality from enterocolitis, according to one set of figures, the children of the rich contribute 0.0 per cent; those of the middle classes, 4 per cent.; those of the poor, 36 per cent., and the children of the destitute, 60 per cent. Need we emphasize more strongly the importance of the children's dispensary and of its physicians, who are almost the only doctors available for the classes of society which contribute to the deaths from diarrheal diseases 96 per cent.?

In the larger cities and wherever the idea of social service in connection with dispensaries has extended, attempts have been made, and will be made, to give systematic instruction at the home in the care of infants and the preparation of their food during the summer. Social workers, district nurses, and health board physicians go among the tenements bringing new light to many mothers and greater comfort and health to their infants. In the attempt at systematic visiting and instruction made in the summer of 1907 by the nurses of the New York Association for the Improvement of the Condition of the Poor, a staff of from ten to twenty-three nurses was in the field from July to September, and visited every dwelling in one of the most congested districts of New York's East Side. They told mothers what to do and where to go when their babies were sick—to hospitals, to dispensaries, to parks, to recreation piers. They visited in all 101,208 individual families and gave instruction in bathing, feeding and clothing children, in cooking, and in the necessity for fresh air. The effect of their work is evident perhaps in the fact that although in the entire borough in which this district lies the death rates were greater in 1907 than they were in 1906, in this district itself there was a slight diminution in both the total death rate and in the death rate from diarrheal diseases.

Such help as this, made possible by organized charity and by the spirit of social service, is available to but few of the great numbers of infants who come to our dispensaries in every part of the country. For them there is only the dispensary physician, busy, hurried, seeing more patients than he can do justice to, interested usually more in the scientific side of his dispensary service than in the social problem so closely allied to it. From him they get too often merely some calomel and a bismuth mixture and the instruction to come again next time. We all realize the temptation to do just this, and most of us have succumbed to it. But do we realize how little we have then done to treat the baby as it ought to be treated; or do we recollect how much we can do, especially now before the summer days come with their humidity, their prostrating heat and their bacteria laden milk, to prevent much summer diarrhea and make unnecessary many pounds of bismuth?

The opportunity of the dispensary physician for social service along this line is almost unequalled. He comes into contact with the poor or destitute mother handicapped by her poverty and by her ignorance, but evincing a tender concern for her baby and a desire to learn how to take care of it by the mere fact of her coming to the dispensary at all. He has far better material than that from which the nurses recently mentioned obtained such good results, for these mothers *want to learn.* They have little with which to do, but it is astonishing sometimes to see the results they are able to get with that little. Few are so ignorant or indifferent that they cannot appreciate the advantages of proper care of their children and their children's food. In New York so generally has the idea of pasteurization spread that nearly every woman will "scald" the baby's milk during the summer without instruction, and some have to be restrained from so doing. Many parents will go without in order to buy certified milk at 15 cents a quart for the baby's food; and when you tell them that "grocery milk" closely approaches sewage in the number of "germs" it contains, they understand and appreciate the fact.

Short, careful talks upon matters of hygiene, showing the personal interest of the physician, make a great impression upon these mothers. They learn that a loose, green movement is always a dangerous movement, and they learn to give a cathartic and to stop giving milk. They do not always come directly to the dispensary as the physician directs, many times because their treatment cures the attack. But this very thing shows what results can be procured in the way of prevention.

Talks by the physician may be supplemented to advantage by printed circulars, or attractive placards which can be hung up in the tenement kitchen. These furnish a daily reminder that the windows of these inside rooms must be kept open; that the baby must be bathed and lightly clothed; that parks and piers are for babies and mothers; that drinking water should be boiled; that soiled napkins should be washed immediately; that bottles should be boiled before being used; that milk spoils on the window sill and should be kept on ice. In the midst of the dirt and confusion, these point out constantly the means of the babies' welfare.

All this the dispensary physician can do if he will. The old problem will soon be here again. That 96 per cent. may be made 95, or even 90. Is not the extra effort worth while?

ROYAL STORRS HAYNES, M.D.

Bibliography.

The International Medical Annual: A Year Book of Treatment and Practitioners' Index. By thirty-two English and American Contributors. Twenty-sixth year. 647 pages. Illustrated. Price, $3.50. New York: E. B. Treat & Co., 1908.

This twenty-sixth volume of the well-known International Reference Book follows the general plan which has proved so satisfactory in recent previous numbers. There is a review of therapeutic progress for 1907, a dictionary of remedies, a discussion of serum therapeutics, of opsonins, of fecal examination in chronic diseases, of the Bier treatment by passive hyperemia, of electro- and radio-therapeutics, and a review of medical and surgical progress during 1907. Then follows the alphabetically-arranged dictionary of treatment.

Dr. George F. Still continues to report upon the medical diseases of children, discussing infant feeding as well as several other topics of importance. Very timely articles are those by Dr. Henry Heiman on Cerebrospinal Meningitis and by Dr. Louis Ager upon Epidemic Anterior Poliomyelitis. A complete résumé of our knowledge of the subject is given in each of these articles, so that they can be used as a practical guide in the managing of these distressing affections of childhood. There is also an interesting paper upon Stammering by Dr. George Cathcart.

The book is well illustrated throughout and will serve, as in the past, as a most convenient reference book of the advances made in all branches of medicine and therapeutics during the year 1907.

Bradycardia and Tachycardia: Part Two of Clinical Treatises on the Symptomatology and Diagnosis of Disorders of Respiration and Circulation. By Prof. Edmund von Neusser, M.D., Professor of the Second Medical Clinic, Vienna; Associate Editor *Nothnagel's Practice of Medicine.* Authorized English Translation by Andrew MacFarlane, M.D., Professor of Medical Jurisprudence and Physical Diagnosis, Albany Medical College; Attending Physician to St. Peter's and Child's Hospital and Albany Hospital for Incurables. Price, $1.25. New York: E. B. Treat & Company, 1908.

This little volume is the second of the clinical treatises on the Disorders of Respiration and Circulation by Professor von Neusser. There is a general consideration of the conditions which induce bradycardia and tachycardia, and then a special study of these disturbances of the heart beat in all the various diseases and intoxications in which they are found. To pediatrists the discussion of bradycardia as it occurs during convalescence from acute diseases, especially after pneumonia, measles, scarlet fever and diphtheria, is of the greatest interest. The two forms of bradycardia following diphtheria are made the object of careful study. The retarded pulse which occurs in acetone poisoning is also important to diagnosticate, because, together with vomiting and rigidity of the neck, meningitis may be suggested; whereas, cyclic vomiting or acid intoxication may be the explanation. This subject receives attention. The appendix contains a paper by Prof. William H. Howell on the Cause of the Heart Beat, and there is included also a study of Adams-Stokes Disease.

MALT SOUP IN INFANT FEEDING.—Thomas (*Ohio State Medical Journal,* January, 1907) has found that not infrequently, even after all other methods prove fruitless, malt soup will, in a surprisingly short time, bring about a return to normal, with rapid increase in weight. This food must not, however, be continued too long in certain cases because scurvy will result. He says that the particular indications for the use of malt soup are found in infantile atrophy or marasmus, and in the dietetic treatment of ileocolitis. The malt soup is prepared as follows: Two ounces of wheat flour are gradually added to 11 ounces of milk, with constant stirring. In a second vessel 3 ounces of a thick malt extract, to which is added 2½ drams of an 11 per cent. potassium carbonate solution, are dissolved in 20 ounces of water at a temperature of 120° F. Finally, the first and second mixtures are mixed and boiled for three or four minutes. This gives a food containing 1.2 per cent. fat, 2 per cent. albumin, and 12.1 per cent. of carbohydrates in the form of easily absorbable maltose.—*Journal of American Medical Association.*

Society Reports.

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, December 17, 1907.

J. W. VANDERSLICE, M.D., PRESIDENT.

DR. S. J. WALKER, in the absence of his patient, reviewed the history of a case of

ERYTHEMA NODOSUM.

In his experience erythema nodosum was an extremely rare condition and one not easily forgotten when once seen. Because it was so extremely characteristic, immediate diagnosis was possible by the practitioner who had seen 1 case. In the last two years he had treated 3 cases.

His cases, one adult and two children—had all been mild, starting in with very little constitutional disturbance, slight fever and malaise, both of children and adult, the children complaining of pain in the joints, though not at all marked or severe. The appearance of the erythema nodosum itself was characteristic in this way: it always appeared upon the anterior surface of the legs and had the appearance in the beginning of a contusion, appearing usually in several spots, or areas, three or four or half a dozen. The subcutaneous tissue seemed to be involved, and the surface was raised very markedly, and was doughy and painful to the touch. Then the discoloration appeared like a simple extravasation of blood, and the appearance of the nodules as the disease progressed corresponded, becoming yellowish, then purplish, and looking exactly like a severe contusion.

Another characteristic of the nodules was that they lasted a considerable length of time. His present case was first seen about ten days ago. All the nodules were just as well marked today as in the beginning, except they had passed through some of the discoloration referred to above. He thought the child would show the effects of this extravasation for a period of two weeks or longer. Another case was at least six weeks in getting rid of the trouble.

Dr. Walker presented Schloss's picture of the disease, which was the best he found in his search of the literature on this subject.

Another interesting fact revealed by Dr. Walker's study of the disease was that some very good authorities considered it a manifestation of rheumatism because a great many of the cases were associated with rheumatoid pains and were seemingly very much relieved by the salicylates. On the other hand, other good authorities claimed it had a good deal in common with tuberculosis. The child he saw two years ago with erythema nodosum, before she was able to be up from the disease, developed enlarged cervical glands which persisted and were undoubtedly tuberculous.

Dr. Walker had found no evidence of tuberculosis in the child he was at present treating for erythema nodosum. There was complaint of a little stiffness in the legs, with some fever. Otherwise this boy of seven years was not at all inconvenienced by the condition.

The treatment was self-evident—quiet and rest in bed, and, because of the extravasation of blood, elevation of the legs.

Dr. Walker said his 2 preceding cases gave the appearance of abscess formation on the anterior surface of the leg, and looked as if about to break down. However, if there should be a breaking down it would vitiate the diagnosis, since erythema nodosum never broke down. In that way it differentiated itself from septic conditions, with which an inexperienced practitioner might confound it.

Dr. F. S. Churchill said he had seen probably 3 or 4 cases of erythema nodosum in his fifteen years' practice, hence agreed with Dr. Walker as to the rarity of the disease. In its relationship to rheumatism, Dr. Churchill called attention to Cheadle's opinion, and the fact that when a child had once shown a manifestation of rheumatism it was very apt to reappear later, even weeks or months afterward, in some other form, *e.g.*, endocarditis. Hence it was important to watch the heart in such cases.

Dr. A. C. Cotton thought he might have seen 6 cases of erythema nodosum in his entire practice, and mentioned 1 instance, a girl of sixteen years, in which it was associated with rheumatism and endocarditis, also 2 other cases in which this disease was complicated with peliosis rheumatica, the last being a child of six years. The peliosis developed first, the parents thinking it was merely an exaggerated form of eruption on the shins.

Dr. May Michael referred to the possible infectious character of erythema nodosum as demonstrated by the report, in a recent number of the *British Journal of Children's Diseases*, of 12 cases, one after another, in an institution. Some of these patients had rheumatic pains and 1 developed an endocarditis, but the main point of interest was the number of cases in succession in one institution.

Dr. J. C. Cook only recalled 4, or possibly 5, cases of erythema nodosum in his practice, 2 of which were in one family, two sisters, respectively eleven and twelve years of age, the former having had chorea the year before. So far as he could recall, he had never found tuberculous trouble associated with this disease. Both of these cases were of decided rheumatic origin, and neither showed any rise of temperature, or constitutional disturbance, but in both instances local elevation of temperature.

Dr. J. W. VanDerslice said he had not seen a case of erythema nodosum in Chicago, but, as London is the place to find rheumatism, there you see everything connected with it almost every day. There he saw erythema nodosum associated with rheumatism. In Vienna he saw a case with Escherich, who was of the opinion that it might be secondary to almost any of the infectious disorders, though more liable to follow rheumatic attacks; that it did sometimes occur in some tuberculous cases, and that he was not sure but that it did occur in cases that were neither rheumatic nor tuberculous.

Dr. VanDerslice did not remember ever seeing a case in the clinics.

Dr. Walker said, in closing the discussion, that he believed it was pretty generally accepted that the condition was one of infection, although what form of infection is not known. Practically all the authorities he consulted called it an infectious disease of unknown origin. He concurred in Dr. Escherich's opinion, as quoted by Dr. VanDerslice, that it was secondary to infectious diseases, especially scarlet fever.

In response to Dr. Cheney's question as to treatment, he said he had given the salicylates because of the possibility of its being a manifestation of rheumatism, and aside from resting in bed with the legs somewhat elevated, that seemed to him the most rational treatment, since the nodules did not tend to get well without some help.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, January 14, 1908.

D. L. EDSALL, M.D., PRESIDENT.

FIBROID NASAL POLYPUS.

DR. ISAAC H. JONES (by invitation) showed a boy of thirteen years, who had a large tumor mass projecting from his left nostril. No growth had been noted until the age of five years, when the left side of the nose became more prominent than the right. There had been some obstruction on the left side always whenever he tried to blow his nose.

Bleeding from the left nostril began June 15, 1907. A small polypoid growth, the size of a finger tip, was found August 13th and removed September 20th. There was profuse bleeding. In two weeks the growth had recurred as large as previously. In October, almost all of the tumor was removed, but it still continued to grow. Drs. Wharton and Stout removed the specimens shown with a snare January 2, 1908. They were attached to the vault of the pharynx on the right side, though the main part of the growth was in the left nostril. The boy cannot breathe through either nostril now, but his "frog-face" has disappeared and the left ala nasi seems to be flattening to the normal shape.

Microscopic examination of the sections showed the growth to be a spindle-celled sarcoma.

DR. HENRY R. WHARTON said that from the free bleeding and rapid growth he believed the tumor was sarcomatous. Another attempt would be made to remove the remainder of the growth with a cold snare, but if it should recur again excision of the superior maxillary bone on the right side would probably be necessary to accomplish the complete removal.

DR. GEORGE C. STOUT said that the best method of removing such growths remained undecided. The general surgeon, as a rule, used one of the so-called external methods, while the rhinologist usually preferred one of the internal methods. The external methods were very numerous, and all were more or less severe, involving the dissection of the external nose clear of the face, or the tying of one or both external carotid arteries. Tracheotomy was usually indicated in the external method and occasionally in the internal method.

As the dyspnea in this case was not great, tracheotomy was not considered necessary, nor would he advise it in any future operation on this boy. A cold wire snare was to be used in preference to the electrocautery or other instrument. Adrenalin chlorid and nitrate of silver, 60 grains to the ounce, should be applied freely to lessen the hemorrhage.

SPONDYLITIS, COMPLICATED BY PSOAS ABSCESS, FOLLOWING MEASLES.

DR. J. TORRANCE RUGH spoke of the number of cases which have recently been added to the literature as cases of infection following measles. He believed them to be really of tuberculous origin. All observers agreed that measles was a serious infection in patients affected with or predisposed to tuberculosis. The soil was most favorable to the development of the tubercular process and the histories of cases reported resembled closely that of a tuberculous infection. Dr. Rugh detailed a case under his care, in which a girl had had an attack of measles at three years, recovering in about ten days. Within a week after recovery she presented symptoms of gastric disorder, but obtained no relief from treatment. When seen by Dr. Rugh three months afterward, there was a well-marked kyphosis in the lumbar region with typical symptoms of spondylitis and an abscess in each psoas magnus muscle. The original cause was undoubtedly tuberculous, stimulated to activity by the measles. Under proper mechanical treatment, both abscesses disappeared and she began to improve. A year later both abscesses again formed after too free exercise, but disappeared after more thorough fixation and support were afforded; and now, four years since the onset, she was well, going about without any support.

FACIAL PARALYSIS IN AN INFANT OF THREE MONTHS.

DR. J. CLAXTON GITTINGS reported this case. The child, a girl aged three months, had been artificially fed and had suffered from indigestion and loss of weight. Three weeks before admission to the University Hospital, a foul purulent discharge from the right ear had appeared, without other phenomena. On admission she presented the characteristic facies of Bell's palsy on crying. In repose, with eyes open, facies was negative. The right conjunctiva was reddened and slightly injected. The anterior and posterior cervical glands below the affected ear were enlarged, but there was no evidence of suppuration. It seemed probable that the nerve was involved in the Fallopian canal, because in most of the recorded instances of paralysis due to pressure of glands at its exit from the foramen spinosum, the adenitis had proceeded to suppuration.

ROUTINE METHODS OF DIFFERENTIATING THE VARIOUS FATS AND CASEIN IN INFANTS' STOOLS.

Dr. T. A. Cope (by invitation) gave a demonstration of the methods of differentiating the various fats and casein in infant stools. The various purely chemical methods suggested were condemned as untrustworthy. The microscope, assisted by stains or chemicals, was advanced as best. He discussed the appearance under the microscope of free fat, fatty acids, soap and casein. The addition of equal parts of ether and alcohol to dissolve free fat; the same to dissolve fatty acid crystals; the turning of fatty acid crystals to free fat by heat; and its return to crystals when cooled, were all spoken of. To differentiate soap and casein, he suggested the method of Schmidt, which consisted of adding acetic acid and heat to change soap to free fat, and on cooling, to fatty acid crystals. Casein by this method remains unchanged. A demonstration of the various methods followed.

Dr. D. J. M. Miller spoke of the difficulty everyone experienced in distinguishing fat from casein in infants' stools. He had so repeatedly found that the soft yellow masses, generally believed to be fat curds, could not be dissolved in ether and alcohol that he had abandoned the test as useless. He had, consequently, come to rely upon the clinical tests, *viz.:* altering the ingredients in the food given and then observing the changes produced thereby in the stools passed and in the general condition of the infant.

Dr. Gittings stated that all the cases whose stools Dr. Cope examined had been fed on low fat mixtures, on account of diarrhea. He inferred either that their digestion and absorption of fat were much below par or that peristalsis allowed insufficient time for them. If chemical examinations of the stools were made more frequently in the beginning of digestive disturbances in infancy and the percentage of fat in the milk mixtures was reduced at once upon the establishment of too great fat loss in the stools, it might be possible to determine whether this loss results simply from too high fat in the mixtures or from an inherent deficiency in fat emulsification and absorption. By the time these cases reached the wards of the hospital, where laboratory facilities were available, it was extremely difficult to differentiate the various factors involved.

Dr. Cope added that his specimens had been secured ten days before, when these babies were taking more fat in their mixtures.

EMPYEMA AND GANGRENE OF THE LUNG, COMPLICATING TYPHOID FEVER.

Dr. Miller reported this case. (See page 347.)

SPINA BIFIDA WITH OTHER MALFORMATIONS.

Dr. John D. Target (by invitation) reported this case. The child was one of twins, both females, born at term. One was perfectly normal, weighing 7½ pounds. The other, this child, weighed 5½ pounds. The mother was tuberculous. In the back of the child, in region of the second lumbar vertebra, was a small opening, with a sinus through which a grooved director could be passed. No sac protruded. The baby had hydrocephalus; supernumerary auricle on right ear; palate was open in the median line for an inch backward from the alveolar process. There was no hare-lip. The bones of the arm and fore-arm were normal, and each hand had four fingers, but was without the thumbs. On the left hand, however, was a perfectly formed thumb, hanging by a piece of skin, about ¾ inch long, attached to the region of the articulation of the radius and scaphoid. The abdomen was distended, especially in the hypogastric region. The sacral bone was wholly absent and below was a cup-shaped cavity in which the anus and vagina communicated; there was no perineum. The

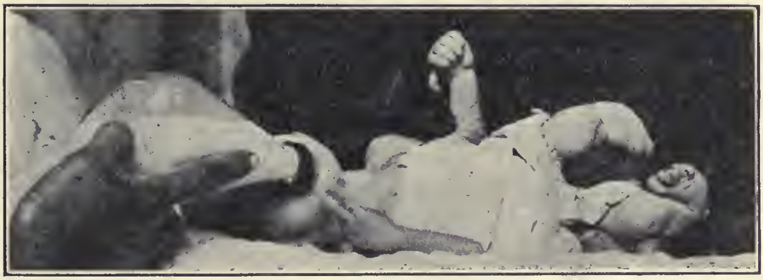

Fig. 1.—Anterior view of lower extremities and supernumerary digit.

femora seemed normal, corresponding to the size of the child. There was complete absence of knee joints and patellæ, and neither tibia nor fibula was present in either leg. The lower limbs were only about 3 inches long and absolutely devoid of any bony structures. There were club feet, the deformity being equinovarus. The toes were all irregular in position.

The child contracted bronchopneumonia and died at the age of twenty-one days. Dr. Delno Kercher was kind enough to take photographs of the child, but, owing to the small room and poor light, good pictures could not be obtained. Dr. Griffith saw the child shortly before it died. The family would not allow an X-ray photograph to be taken, though this might have disclosed still more abnormalities.

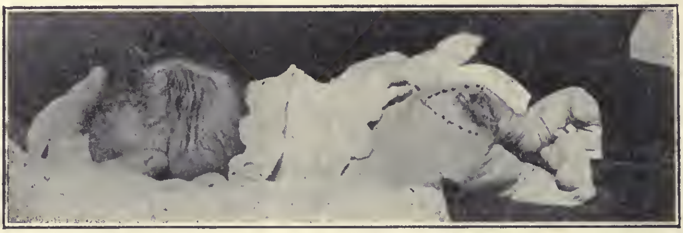

Fig. 2.—Case of spina bifida. The dotted line shows the bony margin of the sacral region. Posterior sacral wall absent. There is an ulcer-like communication between the vagina and rectum. The twisted deformities of the lower extremities are also shown.

Dr. Griffith said this case was most interesting on account of the excessive number of malformations and their association. Such association is frequent, but rarely are so many deformities found in one individual.

Dr. Edsall then delivered the presidential address.

To Soften Cerumen.—Before making an irrigation of the ear about 20 drops of the following preparation should be instilled into the canal:—

℞ Sodium bicarbonate	1.0 gram
Phenic acid	0.6 "
Glycerin Sterilized water	āā 15.0 grams

M.

—*Bulletin Général de Thérapeutique*, February 8, 1907.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, February 13, 1908.

DR. ELI LONG, CHAIRMAN PRO TEM.

A CASE OF POSSIBLE MONGOLIAN IDIOCY WITH BLOOD COMPLICATIONS.

DR. MATTHIAS NICOLL, JR., presented a nine-months-old baby in the hope of obtaining from the members of the section some suggestion as to the underlying cause of the symptom-complex.

The parents were Russian Jews, seemingly in perfect health. There was nothing in the family history on either side to point to syphilis or other conditions which might bear upon the child's clinical history.

The birth was normal, the birth weight about 6 pounds. The mother noted that the child's eyes bulged. It was breast-fed, and up to the age of six months was well nourished, but not bright. At this time it had an attack of suppurative cervical adenitis, requiring surgical interference, followed by erysipelas and severe gastrointestinal disturbance, lasting three months, with great loss of flesh and strength.

At one year of age a physician, to whom it was taken, found the liver and spleen enlarged, with some changes in the blood, the nature of which could not be determined. A trip to the seashore on his advice was followed by a gain of 8 pounds in weight.

About five weeks previously the child was brought to the clinic, and at first glance seemed to justify the diagnosis of atypical cretinism. The physical condition was about as at present, but somewhat more favorable. A photograph was taken at this time. The mental condition was idiotic, with marked irritability when the child was disturbed. The eyes were bulging, due to the very large eyeballs, over which the lids barely closed. The power of sight was very much diminished, the eyes, however, following a lighted match. There was double glaucoma. The spleen was firm, smooth, its sharp edge distinctly felt below the level of the umbilicus. The liver was somewhat smaller than at present, when it extended a hand's breadth below the free border of the ribs. It was smooth and firm in consistency. The temperature had been taken a number of times, and had varied between 97° and 103°. The weight of the child was now 16 pounds. There were eight teeth. The anterior fontanel was still open, the ribs slightly beaded.

Dr. James Ewing made the blood examination and reported as follows:—

Hemoglobin, 63 per cent. (Fleischl-Miescher); red cells, 3,820,000; leukocytes, 11,500 (small lymphocytes, 11 per cent.; large lymphocytes, 42 per cent.; polynuclears, 42 per cent., and eosinophiles, 5 per cent.). In the stained smears he found very marked poikilocytosis, anisocytosis, and polychromatophilia, but no nucleated reds. A very few of the large mononuclear cells proved to be neutrophile myelocytes, when stained by Nocht's method. The marked changes in morphology of the red cells, especially a tendency to show excessive hemoglobin, made Dr. Ewing regard this case as tending to the type of pernicious anemia. He did not think the case was very satisfactory for Banti's category, but thought it was best to call it severe secondary (pernicious) anemia, and the cause was probably found in the history of severe gastrointestinal disturbances. The mental condition must have little to do with the blood.

Dr. Nicoll believed that the facial expression justified a diagnosis of probable Mongolian idiocy. The fundus of the eye had been examined and showed no evidence of amaurotic idiocy. Specific treatment had been without noticeable result.

Dr. Herman Knapp, who was present, examined the eyes and said the pupils reacted to light and that sight was present.

Dr. Henry W. Berg said that he saw a case some ten years ago in which the liver was as large as in the patient presented by Dr. Nicoll, and as hard, with a very sharp edge, and a large spleen. There was also exophthalmos. This child lived a year and a half and developed a loud, blowing murmur over the apex. The diagnosis he made was, with that heart murmur, an exophthalmos due to cardiac insufficiency, complicating a mitral lesion. The condition of the liver and the enlarged spleen were probably also due to the congenital heart lesion.

THE INDICATIONS FOR STIMULANTS IN PEDIATRIC PRACTICE.

Dr. Sara Welt-Kakels read this paper. (See page 350.)

THE USE OF ANALGESICS IN PEDIATRIC PRACTICE.

DR. LE GRAND KERR, of Brooklyn, read this paper. (See page 368.)

HYDROTHERAPY IN CHILDHOOD.

DR. FRIEDRICH K. W. GROSSE read this paper. (See page 358.)

THE PRINCIPLES OF THE CLIMATIC TREATMENT OF CHILDREN.

DR. F. L. WACHENHEIM read this paper. He said the three most important elements which they had to consider were the temperature, the various phases of atmospheric moisture, and the pressure of the air, the last chiefly modified by the elevation above the sea level. Climatic rest cures were especially indicated in such affections as nephritis and uncompensated cardiac lesions. In applying the diversities of temperature the first object should be to ascertain that indifferent temperature which felt neither warm nor cool, and was therefore most restful. Temperatures above the indifferent point were not at all sedative, but involved a continuous stimulation that was most harmful if prolonged. It was evident that we had within our reach some very delicate gradations in applying the climatic rest cure, if we balanced carefully the factors of temperature, age and exercise. It should be remembered that young children stood severe cold badly. With regard to the atmospheric moisture, rain was useful in moderation, as was a permanent winter snow-sheet, for laying the dust, but the alternations of frost and thaw, rain and snow were objectionable, causing sloppiness underfoot, etc. A low relative humidity was extremely valuable in lowering the sensible temperature or raising the indifferent temperature. The relative humidity at moderately high temperatures was important for such cases as called for free transpiration; here a warm and moist climate was indicated as being the best diaphoretic known. With regard to high altitudes, they were admirable as a general tonic in torpid stages, but contraindicated in severe organic diseases, where rest was indicated. The anemias of young children did best at moderate elevations, and the same was true of the victims of general malnutrition, rickets, scrofulosis and chronic tuberculosis.

DR. HERMAN F. L. ZIEGEL said that there were two points in connection with Dr. Wachenheim's paper that he wished to refer to. One was the influence of seasonless climates on infectious diseases in children. Some six years ago he said he had spent nearly one year in Southern California and had been impressed with the fact that in that section measles, scarlet fever, diphtheria and bronchopneumonia were very mild, and were seldom followed by complications. Recurrent attacks of tonsillitis in children with rheumatic pains, so common in the cities of the East, were hardly ever seen in Southern California. One case in particular, a little girl of nine or ten years, who had had attacks of tonsillitis very frequently in New York during the winter and spring, when taken to Southern California, ceased having these attacks. Therefore there was therapeutic applicability in this climate.

The second point was the influence of altitude on anemia. Dr. Jacobi had highly recommended a sojourn in the mountains in cases of chlorosis in children; both the erythrocytes and hemoglobin were as a rule greatly increased by the change. In some cases, on the other hand, anemia was actually produced by these altitudes. This constituted the so-called *anemia montana,* in which the symptoms were palpitation, a sense of suffocation, faintness, hemorrhage from the nose and mouth, etc. In these cases, either the erythrocytes were increased or remained constant; while the hemoglobin was markedly reduced. He said he would like to know why in some cases altitude cured anemia, whereas it actually caused anemia in others.

Dr. F. L. Wachenheim, in answer to Dr. Ziegel, said that in a place of the altitude of Denver, the erythrocytes were normally 7,000,000. Therefore if one went from a lower altitude with only 5,000,000 erythrocytes, he would suffer from anemia, such a condition being the equivalent of a reduction by hemorrhage in New York or Chicago of from 5,000,000 to 3,500,000 erythrocytes. After three weeks' stay at the altitude of Denver one no longer suffered from anemia, for the red cells would have reached 7,000,000, the hemoglobin being a little behind this proportionately. In the milder forms of anemia, the red cells were increased by removal to the mountains, but this was not true of the secondary anemias of childhood. It was a great mistake to send children to altitudes of 16,000 feet.

Dr. Henry W. Berg said, with regard to Dr. Welt-Kakel's remarks on the use of venesection in cases of high tension with temperature, that venesection in children in his experience was one of the dangerous things to do. He said that he had seen children venesected years ago in pneumonia, and he had always believed that this was the straw that broke the camel's back. Furthermore, in attempting this in children, one was confronted by the difficulty of finding the vein to the extent that venesection in children was contraindicated. Moreover, children stood the loss of blood badly.

Antipyrin as an analgesic should be avoided. He never gave the coal-tar preparations to children and thought that antipyretic drugs were contraindicated in children.

DR. HENRY DWIGHT CHAPIN believed that Dr. Berg had a wrong impression regarding the use of antipyrin, for in whooping-cough it was one of the most valuable of drugs.

DR. B. VAN D. HEDGES, of Plainfield, N. J., said that the late Dr. O'Dwyer recognized the value of large and heroic doses of alcohol in the treatment of diphtheria in the pre-antitoxin days, giving as much as a tablespoonful of brandy every two hours.

DR. FRIEDRICH K. W. GROSSE said that he had never used any cardiac stimulant but alcohol, and had never used antipyrin.

In regard to the rise of the erythrocytes from increased altitudes, he thought it might be due to such causes as the rapid increase of red cells after hydrotherapy, where the red cell count might increase 1,800,000 in the course of half an hour. This was apparently due to a change in the distribution of the blood. After cold applications, immature forms of red corpuscles were frequent, evidently having been drawn from the deep blood-forming organs.

DR. HENRY HEIMAN said that in those cases in which digitalis was indicated, in order to get best results the patient should be put to bed.

With regard to the use of coal-tar products he stated that the well-known saying about opium is also applicable to phenacetin and salol, namely, that if taken out of the pharmacopeia, physicians would have to give up the practice of medicine. He has never seen any untoward effects from the use of these drugs. When administered the patient must be carefully watched and the dose must not be too large.

With regard to the hydrotherapy this method is of value. Robust children bear cold baths well, while the weaklings require the use of warm baths.

Dr. F. L. Wachenheim said he would like to ask Dr. Grosse if he went to Leadville, Colorado, how he would explain the fact that in the course of three or four weeks the blood would show 8,000,000 erythrocytes, an increase of 3,000,000. Did he mean to say that three-eighths of the total number of erythrocytes had been stored away? With the cold water treatment there was a difference of but 500,000 at the most.

Dr. Sara Welt-Kakels said that she used antipyrin in whooping-cough, and that it could be given with safety in small doses; the larger doses caused cardiac depression.

In regard to venesection, this was an old method of treatment that now was coming into vogue again, although there was not much danger of people today becoming enthusiastic over it. Dr. Welt-Kakels said she had never used it, but this was not because she did not believe in its value, but simply because she had not had the opportunity to use it. It had been done in uremia with very happy results.

Dr. Herman F. L. Ziegel said that he did not feel that Dr. Wachenheim had answered his question. The late Dr. Solly, of Denver, had proven in exceptional cases that though patients came to Denver with no circulatory disturbances and no anemia, yet in a short time they would become anemic, with a hemoglobin index greatly reduced. He granted, however, that in most cases altitude had a beneficial effect upon the blood.

Dr. F. L. Wachenheim closed the discussion. He said that those cases referred to by Dr. Ziegel must undoubtedly have been abnormal. Observations had been made that the inhabitants in the Alpine mountains have an erythrocytic count of 7,000,000; while the inhabitants in the valleys have but 5,000,000. It had also been observed that those people living at an altitude of but 2,000 or 3,000 feet above the sea level have only 6,000,000 erythrocytes. It had been demonstrated that the number of erythrocytes increased with elevation. If an average healthy individual ascended from a low level to 16,000 feet he would have symptoms of anemia at once, such as faintness, dizziness, collapse, etc., the same as though he was suffering from the effects of a hemorrhage. In the course of time, however, the blood through its recuperative power catches up.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. HENRY HEIMAN. DR. JOHN HOWLAND.
DR. G. R. PISEK.

PATHOLOGY.

FABYAN, MARSHAL: DISSEMINATED SUBCUTANEOUS FAT NECROSIS, OCCURRING IN AN INFANT WITHOUT OTHER LESIONS. (*Bulletin of the Johns Hopkins Hospital,* September, 1907, p. 349.)

A colored child born at term of healthy parents developed, on the third day of life, numerous so-called abscesses on both cheeks, forearms, on the back of the head, one buttock and the right lower leg. All of these later became absorbed but the one on the right cheek. This was incised and two drams of pus obtained, which by culture was sterile. The wound apparently began to heal, but on the fourteenth day the child died suddenly, apparently from suffocation. Sections from the right cheek and from the other nodules which had not entirely resolved, showed typical fat necrosis. The pancreas failed to show any pathological lesion. JOHN HOWLAND.

MEDICINE.

LEMPP, K.: ACQUIRED ENDOCARDITIS IN INFANCY. (*Monatsschrift für Kinderhk.,* May, 1907, p. 79.)

In infancy, as in adult life, the left side of the heart is most frequently affected by endocarditis. The etiological factors at this period of life are bronchitis, pneumonia, influenza, tuberculosis, pyemia, and septicopyemia. Rheumatism is a rare cause on account of its infrequent occurrence in infancy.

The symptomatology varies considerably from that observed in older children and adults. Local symptoms are not prominent, occasionally entirely absent. In the author's 7 cases, in which the diagnosis was confirmed by autopsy, no murmur was audible. Cardiac enlargement was demonstrated in only 2 cases during life, although present in all at autopsy. The author attributes the unsatisfactory results of percussion to the small size of the chest and the rapidity of the respiration.

More important than the local signs is the evidence of disturbed circulation. The appearance of the patient is characteristic; the complexion is pale and livid. There is a tendency to cyanosis and coldness of the extremities. Dilatation of the veins of the neck and head is often present. The pulse is rapid, often irregular in force and rhythm. Characteristic attacks of cyanosis often occur, lasting one to two minutes, and followed by intense pallor and relaxation of the whole body. At the terminal stage attacks of apnea are seen. The most important symptom was the change in the pulse—respiration ratio $\left[\frac{(P)}{(R)}\right]$. The normal ratio being 4.5, in this disease it may be reduced to 2.8 and occasionally to 1.8. The respirations are superficial. Fever is remittent in type, occasionally it is absent. The liver and spleen are enlarged.

The prognosis is grave. The author recommends caffein and camphor as stimulants in cardiac weakness; collargol in septic cases.

Henry Heiman.

HYGIENE AND THERAPEUTICS.

Kuhn, Philipp: Experiments in Feeding with Preparations of "Dutch" Infant Food. (*Die Therapie der Gegenwart,* June, 1907, p. 258.)

The preparation is made from sour cream, and is said to keep indefinitely and to be possessed of all the essential properties of buttermilk. Sugar and wheat flour have been added. It is offered for sale in a liquid and dry form. The author tried it in 30 cases with excellent results. He believes it is worthy of trial in cases of allaitement mixte, dyspepsia, enteritis and infantile atrophy. It is also recommended in cases where it is desirable to give a small amount of fat, as in fat-diarrhea, icterus and in cases in which modified cow's milk persistently disagrees.

G. R. Pisek.

Jakinov, V. L.: The Decomposition of Atoxyl. (*Ruski Vratch,* August 3, 1907, p. 999.)

In the Institute for Experimental Medicine in Russia, Jakinov tested the durability of atoxyl solutions, and reached the following conclusions: Weak atoxyl solutions (1 to 2 per cent.) can be kept in a dark place for a fairly long time. Stock solutions should not be sterilized, but should be made with sterile cold water. Before injecting the solutions they should be previously boiled. If the solution turns yellow in the slightest degree, it is not to be used. Any alkalinization of the solution should be avoided.

G. R. Pisek.

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VOL. XXV.] JUNE, 1908. [No. 6.

Original Communications.

INTESTINAL INTOXICATION IN INFANTS.*

BY REUEL B. KIMBALL, M.D.,
Attending Physician, Babies' Hospital, New York.

In selecting this well-worn theme for my subject, I feel that I owe this society an apology, inasmuch as, several years ago, I presented to you a paper on the same general subject. But as my experience widens I find this topic more engrossing, and I am more and more impressed with the feeling that our knowledge of it is still inadequate and that we are just at the threshold of a door that will open up new and rich fields of investigation as our knowledge of physiological chemistry increases, so that many things now obscure and imperfectly understood will become clearer.

To one whose work is largely among children, this question of intestinal poisoning is of paramount importance, because it is fraught with much greater danger than a similar condition in adults. I shall attempt to deal with this matter from a practical and clinical point of view only, as my knowledge of its chemistry and bacteriology is very meagre. Also, I shall not attempt to cite any authorities, although the medical literature of the present teems with contributions on this subject. I shall attempt to discuss only cases drawn from my own experience, my own conclusions in regard to, and my own methods of treating, them. I do not wish to claim originality in any of these particulars. I am dealing with a very familiar subject. Yet I feel that it is not understood as it should be by the generality of medical men, for I meet practitioners very often who do not at all grasp the situation, and I am sure that many lives are sacrificed to ignorance of a matter that should be universally understood. This is no doubt partly due to the fact that few text-books seem to consider it important enough to merit more than brief mention.

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* Read before the Practitioners' Society, New York, November, 1907.

I should like to preface my remarks by a brief statement of my position in regard to acute intestinal poisoning. I believe that it is the cause, in little children, of more serious results than any other single factor—that its results are very subtle and far-reaching. I have often seen babies die in a short time from this cause alone. There is no doubt that many supposititious cases of meningitis, cerebral hemorrhage and other grave cerebral conditions are due to intestinal reflexes alone, and that the serious possibilities of milk intoxication are only beginning to be understood.

In speaking of intestinal intoxication, I do not include cases accompanied by diarrhea. This is too wide a field and is generally quite well understood. In these cases the diarrhea is an effort of nature toward spontaneous cure and is entirely conservative. I have in mind only instances in which the poison is locked up in the bowel and in which absorption is rapid and dangerous. There seems to be no effort to get rid of the poison, and it is often extremely difficult, and sometimes impossible, to stimulate the gut to empty itself. Whether this is due to a torpor or to atony, or to an actual paralysis, it is difficult to determine; in some instances there seems to be an actual tetany of the muscular coats that resists all efforts at relaxation. This may seem fanciful, but it is difficult to explain the phenomena on any other hypothesis. In more than one instance I have given over a pint of castor oil, in repeated doses, and many irrigations before the grave danger was past and the bowel emptied. In such cases I believe that it is just as important to empty the gut as a septic uterus, or any suppurating cavity, no matter how heroic the necessary measures.

I have selected the following cases as types, and I will allude to them as briefly as possible:—

CASE I. In August, 1906, I was called in consultation to see a child at Deal, N. J. I was the fourth physician in the case. The patient had been ill for two days. The attack was ushered in with a violent convulsion and with no rise of temperature. The convulsions had continued, at varying intervals—altogether there had been six seizures—all of them very severe, lasting about half an hour. Between the spasms the child had been stuporous and had vomited frequently. Calomel and castor oil both had been administered, and the attending physician assured me that the intestinal canal was thoroughly emptied. The diagnosis of meningitis had been made and accepted by all three of the doctors. Inspection of the patient showed a very well-nourished child, very pale, stuporous, and aroused only with difficulty. Further examination was prevented by the onset of a convulsion, which began suddenly, with violent general twitching.

I ordered a mustard bath and put in it a Davidson's syringe, and, while the doctor and nurse were bathing the child and dashing ice-water on its head, I inserted the nozzle of the syringe into the rectum and pumped the mustard-water into the bowel for several minutes. After fifteen minutes in the bath the child was wrapped in blankets with an ice bag at its head, the convulsive movements gradually lessening. While I was making preparations for an irrigation, masses of fecal matter began to come away and the child had the largest single movement I ever saw. There must have been more than a quart. It was smooth and well digested, normal in color, and had no unusual odor. I washed out the colon thoroughly later, but little came away. I gave half an ounce of castor oil and advised the rectal administration of 5 grains of chloral. I saw the child on the following day. It had no more convulsions. It was still very stupid and had slight strabismus. The doctor told me that the next irrigation, given in the evening, had brought away much fecal matter of very foul odor. I advised castor oil to be given every five hours and enemata at the same intervals. For three days the foul, green actions persisted, but only with the irrigations. There were no spontaneous movements. The child had a slow convalescence, with insomnia, frequent attacks of colic and great irritability. It was put on malted milk and barley. It has been in good health since, although it has never been able to digest cow's milk except in small quantities.

This case is noteworthy from the very large fecal accumulation that existed in spite of large doses of cathartics. The degree of systemic poisoning was not very profound and not followed by the usual severe enteritis. There was no fever at any time.

CASE II. The second case is an exact antithesis of the preceding one, in that the alimentary canal was empty; the amount of toxic material was small and definitely known and the symptoms of poisoning were very unusual.

The child, twenty months old, had had an attack of gastrointestinal catarrh, which lasted about a week. The case was sent to me from Summit, N. J., by Dr. Walter James. The illness had been quite severe, but the child was now convalescent. It had had no nourishment for a week except barley gruel and animal broths. It was emaciated, pale and languid. The temperature was 100°F. The only stool that I saw was thin, smooth, with very little odor, just such a discharge as would be expected from such a diet. It was also black from bismuth. The child had little appetite and was very fretful. I ordered an ounce of beef juice, which had to be prepared in the hotel kitchen. The baby took this with apparent relish about 7 P.M. and within an hour had gone to sleep. At midnight, five hours later, I was summoned in a hurry, as the baby was acting very strangely. I found it in a condition of wild, almost maniacal, excitement, screaming, throwing itself about in its nurse's arms and wildly calling her name, looking for her all over the room. It was evident from this that the child was blind. It had a wild expression and a very active rotary nystagmus, which the mother told me was new. I took the temperature with difficulty—it was 103°F. The child seemed on the verge of a convulsion. I gave it half an ounce of castor oil and proceeded immediately to wash out the colon. This was a very difficult procedure, owing to the violent movements of the child, whose screaming had increased, arousing the people on the floor. I think the nystagmus was the most violent I ever saw. I passed the tube with some difficulty, and had proceeded several minutes with the irrigation when the screaming became less, child became quiet and the nystagmus diminished. The enema brought away very little. In half an hour the child was quiet, but wide awake; it remained greatly excited all night; did not sleep at all. At daybreak, five hours later, I was summoned again and found precisely the same condition. Nystagmus had reappeared; child was screaming and throwing itself about as before. Again the irrigation was begun and, in a few moments, both screaming and struggling subsided and the child became quiet as before. This irrigation brought away considerable mucus and the odor, toward the last, became very foul—that peculiar nauseating smell that always obtains in cases of intestinal toxemia, which is pathognomonic of that condition. I do not remember to have ever seen a case of intestinal intoxication of any severity that did not exhibit this symptom.

This singular condition reappeared every five or six hours during the day, with no abatement in violence. In the afternoon I had the child removed to the Babies' Hospital, two miles distant, as it was impossible to care for it properly in the cramped rooms of a hotel. There the scene was re-enacted for three days, the symptoms gradually subsiding, the interval between the attacks becoming longer and the seizures less violent. Between the attacks the child was wide awake, and did not sleep at all for forty-eight hours, although chloral and bromides were given in considerable doses. A cathartic was given three times a day and an enema whenever the excitement and nystagmus appeared; the foul odor of the discharges became gradually less and, on the third day, the child had short intervals of sleep. During the whole of this time it obstinately refused any nourishment, even water, and fought violently against it. I began, on the first day in the hospital, with gavage, giving it 4 ounces of granum gruel with 2 drams of liquid peptonoids. This was alternated with mutton broth. At the end of a week the nystagmus and screaming attacks had entirely gone, the child was removed to a boarding house in the village near by, and a nurse was sent from the hospital every four hours to give the gavage. At the end of two weeks the child was sent back to its home in Summit; it had gained a pound and seemed well and happy; its stools were normal, but it still absolutely refused to eat. The gavage was continued for two weeks more until the child had gained 3 pounds. It had taken no cow's milk, but it had been fed with malted milk, gruels and eggs. At the end of this time I sent for the nurse to come back, and I know nothing more of the history except that the child was starved into submission and has been perfectly well since.

This case illustrates very well how very little poisonous material is needed to set up a very grave infection. Moreover, this infection may reproduce itself rapidly and often for a long time. It shows, also, the danger of preparing food for infants in hotel kitchens. Hotel food, at the best, is always bad for children. No careful record of the cathartics was kept in this case until it reached the hospital. After that, it had a tablespoonful of castor oil about every eight hours, and the irrigations, which were very thorough, by means of a tube passed up through the sigmoid flexure, were given at intervals of every five hours. The toxic symptoms, nystagmus and insomnia were also rather unusual and in sharp contrast to the stupor of the preceding case.

CASE III. Baby, eight months old. Seen in consultation last July. The child was apparently in collapse, pallid, eyes sunken, lids half opened, fontanel depressed, extremities cold. It had just been brought from the city to Long Branch, with a history of a week's illness consisting of mild diarrhea, occasional vomiting and temperature fluctuating from 100° to 102°. The doctor in charge of the case had given a grain of calomel a few hours previously; this had been followed by a dose of two teaspoonfuls of castor oil. There had been one stool. It was greenish and contained a few shreds of mucus, but otherwise was smooth and not very bad. The child had been fed for two weeks on cow's milk and malt soup, with a history of overfeeding. Its abdomen was flaccid, very soft, and its condition very apathetic. It seemed dazed and cried feebly when violently disturbed. Refused all nourishment, but resisted it feebly; temperature, 99.4°F. I could not come to any conclusion concerning this case until the tongue was examined. I found this absolutely dry, a condition not uncommon in sick children after a journey. I called for water and gave it a teaspoonful, putting it in the corner of its mouth with a dropper. The child took it eagerly and followed the movements of the dropper with its eyes. For fully half an hour I had the nurse give water constantly, and not until it had taken nearly a tumblerful did its thirst seem to be relieved. After this it seemed brighter. In the evening the doctor telephoned me that it was very much better. I concluded that the apparent collapse was due to a loss of water from its blood. The following morning I saw it again. The bowels had moved only once from the purgative; the appearance of the stool was negative, such as one would expect to find from a diet of barley gruel; the child acted more naturally, although it was very irritable; seemed to be in fairly good condition; temperature, 99½°F. I advised the doctor to give a high irrigation, as the purgative had not acted as thoroughly as was expected. I also advised condensed milk to be added to the barley in the proportion of 1 dram to 6 ounces; the child seemed to be convalescing after a mild attack of gastroenteric catarrh and I dismissed it entirely from my mind. Six hours later I was summoned in haste and found the child stuporous and again in apparent collapse; condition very like the preceding day, except that the tongue was moist and the temperature had risen to 102°. I washed out the bowels myself, using one of my own tubes, which I was able to pass with little difficulty. After a few minutes masses of white, undigested milk curds began to appear in the escaping water, the first I had seen. The odor, which had not thus far been noticeable, now became exceedingly foul and larger amounts of partially digested milk began to appear. For two days thereafter the enemata were repeated at intervals of four hours, and castor oil was given in half-ounce doses every eight hours. The stools, which were never spontaneous, consisted, during that time, of undigested milk and masses of clear mucus, and the odor persisted. During that time, also, the child was semi-comatose, and some of the time could not be aroused at all. There was little evidence of catarrhal inflammation in the stools, which were mostly half-digested milk. During this time the temperature did not rise above 100°F. Every attempt to give food was resisted; the child would cry feebly for a minute and relapse immediately into a stupor. The pulse became rapid (160), feeble and irregular. The temperature was subnormal. Gavage was begun on the second day—4 ounces of granum gruel and a dram of panopepton every four hours, with half of the white of an egg. This was seldom vomited. On the second day the child's vital condition was so low that I gave 150 c.c. of saline solution by hypodermoclysis. This was given at one sitting in four different places, and the procedure was repeated daily. This condition lasted about a week; it took two days to get the old milk curds away, then the granum began to come through in the washing. To my surprise it was fairly well digested. During this time the child was entirely blind, and if the irrigations and castor oil were not given promptly the symptoms would become much worse. The family noticed this, and would frequently ask that castor oil should be given to the child, the beneficial effect of it was so perceptible. At the end of the week it began to brighten up; it would follow bright objects with its eyes and, in its intervals of consciousness, seemed to know its mother and began to pay attention to noises, which it had ignored for a week. During this time it lay perfectly limp. The respiration was irregular, often sighing. It had no rigidity during its entire illness, no convulsive attacks, no signs of cerebral irritation. Another physician, who was called in consultation when I could not come, made a diagnosis of meningitis, which he asserted had obtained from the first. The child gradually improved, condensed milk was added to its granum in proportion of 1 dram to 6 ounces; odor entirely disappeared from the stools; digestion was fairly good. It began to notice much more and looked as if it were going to recover. At the end of the second week I saw it only every other day; the nourishment had been increased to 5 ounces. But the improvement was only temporary —the brain had been too much injured by the severity of the toxemia; hydrencephaloid symptoms gradually reappeared. The child lived three weeks from the time I first saw it, and finally died of exhaustion and heart weakness. During the whole illness it had but two or three spontaneous movements; usually a full dose of castor oil and an enema were required. The appearance of the stools was usually quite good, but toward the last they were occasionally green and contained masses of mucus; the foul odor invariably returned if the oil enemata were not given. Over a pint of oil was given during the illness. The food given by gavage was usually retained. Hypodermoclysis was practiced four times and with no signs of local irritation. Before death I made a Quincke's spinal puncture to satisfy the attending physician that the child did not have meningitis. Up to that time I am sure he had a lingering doubt. About 20 c.c. of a perfectly clear fluid was obtained. It came without signs of pressure and remained perfectly clear in a sterile tube for twenty-four hours. There was never any evidence of deep-seated intestinal inflammation. The urine was normal at first, but contained a trace of albumin toward the end.

It seems to me this was an unequivocal case of pure intestinal toxemia, with the symptom-complex known as hydrencephaloid, or spurious hydrocephalus. If any autopsy had been possible, I have no doubt it would have shown a condition analogous to the wet brain of drunkards. At any time during the three weeks, if the food had been allowed to accumulate in the intestines, symptoms of deeper toxemia would have appeared at once. Most cases of profound intestinal intoxication lead to subsequent enteritis; in this case there was little or none.

CASE IV. R. S., fourteen months; 8 pounds at birth; nursed by mother eight months. After weaning continued to thrive, except for occasional mild attacks of intestinal indigestion.

These were caused, as I suspected, by the nurse increasing surreptitiously the strength of the formula—a fault that is not uncommon where too much stress is laid upon the weekly gain, and the loss of a few ounces throws the entire household in mourning. Weight at fourteen months, 25 pounds, 5 ounces; food consisted of 7 ounces of milk with 1 ounce of barley gruel in each bottle, five feedings at four-hour intervals. Late in April, as the curdy stools increased, the formula was reduced to one-half milk. This did not help matters; stools were still undigested and often very foul; appetite was capricious; there was too much flatus and unusual irritability, which was partly due to teeth. As the first molars were imminent, early in May the milk was reduced to one-third, with no improvement. This was changed to condensed milk, 1 dram to 6 ounces of barley gruel. May 5th the child began to vomit; temperature rose to 101° in the morning, 104° in the evening; all nourishment stopped except albumin water; ¼ grain calomel every half hour for eight doses, followed by half an ounce of castor oil and thorough irrigation of the bowel. The child became rapidly stuporous; lay with lids half open, eyes rolled up. Did not even rouse thoroughly for the enema. Fought violently against nourishment, even water. No movement resulted from the cathartics—nothing came except with the irrigations. This consisted of foul-smelling milk curds, which gradually gave place to green mucus. There was no vomiting after the initial attack. The baby lay in this stupor for ten days. It passed nothing from its bowels except green, foul mucus that looked like seaweed, and this only after large doses of castor oil. The enemata were not even effective unless a preliminary dose of oil had been given. Temperature fell gradually to normal after the third day. A perfectly regular system was adopted—irrigation every four hours, castor oil ½ ounce to 5 drams every eight hours; nourishment, which consisted of equal parts of broths and barley gruel or panopepton and albumin water, were forced with great difficulty every two hours. The bad odor persisted for a week and the amount of green mucus that came after each irrigation was incredible. It must have been at least half a pint each time. From the beginning the child seemed indeed very sick. The extremities were cold, the pulse was 150 to 160 and weak. Respiration was sighing and sometimes irregular. Strychnin (grain $^1/_{200}$) was given regularly every three hours. At the end of a week there was little change except marked emaciation. Still semi-comatose with occasional fits of screaming, during which it would tear at its face with its nails. If the cathartic and irrigations were not promptly given, all the symptoms were worse—the coma would deepen and the foul odor reappear. The irrigations were very tedious and often took nearly an hour. The long tube was abandoned, as the child was too weak, and a short tube four inches long used. The child was often held up in an inverted position for several minutes; usually it was necessary to allow the water to run in for twenty minutes before expulsive efforts were induced. May 21st, two weeks after the onset, there was little improvement in the child's condition. Castor oil was still necessary every twelve hours, irrigation every six hours. Stools still abundant, consisting of mucus with occasional signs of fecal matter; odor entirely gone. Whey had been given, but abandoned for malted milk, 1 dram to 4 ounces of barley or Mellin's food in same proportion with albumin water and panopepton in intervals of feeding. The total quantity of nourishment on this date consisted of malted milk and barley, 15 ounces; albumin water, 7 ounces. Urine abundant, contained trace of albumin. Was still apathetic and stupid most of the time, but had violent screaming attacks and at times seemed maniacal.

On May 22d was taken to the country, after several consultations with Dr. Holt. Dr. A. W. Bingham stayed in the house with it for eight days. At this time it became very puffy in the face and rapidly developed general edema, evidently due to hydremia. Specific gravity of the blood had become so low that osmosis was reversed. Fluid diet was now reduced as much as possible, and food given in form of jelly. By continual scratching and tearing at its face, the skin had become infected and a septic dermatitis spread over the whole face and scalp, closing both eyes and making the child's appearance most pathetic. The first edema subsided slowly, but was quickly followed by a second and worse attack. After this cleared up the weight, early in July, was 14 pounds, 14 ounces—a net loss of 10 pounds, 7 ounces during the illness. Stools were rarely spontaneous. They were still very bad and often foul, consisting of masses of mucus and partially digested food. Sometimes the child would scream for hours at a time, as if insane. Its skin was wrinkled like an old woman's and covered with scars and patches of erythema and eczema, and it hardly seemed possible that it had vitality and protoplasm enough to carry on the chemistry of life. But I was mistaken. Early in July it had an acute attack of vomiting and high temperature, and I believed the end had come. It lay perfectly still and white, with its eyes rolled up, and mentally I gave up the fight. In despair I gave a grain of calomel and repeated it two hours later. This was followed by a monumental clearing out, and from that moment the improvement began. It was very slow and often interrupted by reverses. It took two weeks to gain the first ounce, and condensed milk was the food that finally succeeded. The baby now weighs 19 pounds and is improving all the time. I am now changing the food to malt soup and cow's milk. Its hair has all fallen out, and it is beginning to find out that it has legs, although still too weak to stand. This is a particularly good example of very grave intestinal toxemia with complete atony of the bowel, and the child was saved only by heroic doses of cathartics and other rigorous methods of emptying the intestinal canal. Over a pint of castor oil was given in the first ten days, and therein lies the crux of the whole matter.

In all intestinal infections cathartics should be given in large doses and at once—all traditions of dosage must be ignored. I could cite many cases like this, and several times I know I have saved life by a bold dose at a critical moment. Even vomiting is not a contraindication. Castor oil is so adhesive that it cannot all be vomited and, if repeated boldly, enough will soon be retained to evacuate the intestine. Calomel is so heavy and insoluble that it is not easily vomited and, if persisted in, will usually act. In my experience of twenty-seven years I have never seen any harmful result from either drug.

CATHARTICS.

In the foregoing cases it must be remembered that the intestine was unresponsive, ordinary stimulation was of no avail, the gut itself was more or less paralyzed, and the nerve centres were dulled by the toxemia. Calomel is a most useful drug, and I always use it in cases of diarrhea where the bowel is already active. I have heard a well known pediatrist say that it is so harmless that it might be given by the teaspoonful. In my opinion, however, it hasn't sufficient initiative to be always available, and to depend upon it in serious cases is only losing valuable time. It should always be given in ¼ grain doses, repeated according to the demands of the case. Doses of $^{1}/_{10}$ of a grain, in my opinion, are useless. Even for infants a few days old $\frac{1}{8}$ or $\frac{1}{6}$ of a grain is a better dose. If not effective in two or three hours it should be followed at once by a saline or castor oil. I believe that there would be few serious cases of dysentery if the initial infection were promptly and vigorously removed.

Next to castor oil I like the senna preparations. Salts in solution are preferred by many writers, and are considerably used for this purpose, but it is necessary to use a large quantity of water to dissolve them and the taste is also disagreeable and apt to induce vomiting. The sulphates of soda and magnesia are generally used for this purpose. Sulphate of soda is sparingly soluble in water; the solution in use at the Babies' Hospital contains 15 grains to 2 drams. If any stronger than this it will crystalize. They are very useful in dysentery given in small repeated doses. Milk of magnesia is popular; it is antacid and prompt, especially if given with orange or lemon juice, but it is mild and not to be relied on in serious conditions. Cascara, in aromatic fluid extract, is good but slow, and liquorice powder is one of the best all-round laxatives in doses of a few grains to ½ dram, but it is slow. Rhubarb, in syrup or tincture, is useful in mild diarrhea, and has a secondary astringent effect, but, in all serious cases where promptness and certainty of action are indispensable, castor oil is the best, either pure or in the form of laxol. The latter preparation has no taste of castor oil, as it has been disguised by peppermint, but it is very sweet and not so good for continued use. Pure castor oil may be given every few hours for days and it is harmless. I have never seen any ill effects from its use.

IRRIGATION.

Enteroclysis is an indispensable manoeuvre in all intestinal affections, but I believe that it is often overdone. It is sometimes unnecessary and harmful, and oft-repeated irrigation is rarely necessary. The chief indications for its use are bloody stools and tenesmus, which it will usually relieve. It should be used in all high temperatures, or other emergencies, but after the intestinal canal is thoroughly emptied irrigation should not be kept up unless it is necessary to relieve pain or remove bacteria or other toxic products that have accumulated in the intestine.

In little delicate babies it is dangerous. I have seen it produce shock and serious laceration. It should be remembered that it is always more or less exhausting, and that in ordinary diarrhea, where the products of inflammation are few, it is often meddlesome and dangerous. The technique is not simple; it requires care and practice to do it properly. I generally use a tube made especially for me by Tiemann—a No. 24 French, with three openings, one at each side and at the end. As the chief object of irrigation is to remove everything from the bowels, the more means of exit the better. The rubber should be as stiff as possible and highly polished, and it should be at least two feet in length. I use a douche-bag holding 2 or 3 quarts. At first, it should be held about two feet above the child, so that the initial current will be gentle and not excite too active peristalsis. The bag may be raised higher after the current is established. I insert the tube about two inches and then allow the water to run. As the rectum balloons the tube may often be passed up through the sigmoid flexure. If the first few attempts are not successful and the tube bends on itself, it is best to insert the finger and guide it. If, after repeated attempts, the tube will not go up, it is much better to discard it altogether. Raise the baby's buttocks and allow the water to find its own way into the colon; sometimes it will take great patience, and it may be a long time before expulsive effects begin. I often take the baby by its heels and raise its body up to a right angle and hold it in this position for a few minutes. If the long tube passes without too much delay and irritation, the water should be allowed to run until the child shows signs of uneasiness, then the tube and the nozzle should be separated and the water allowed to run out. This may be repeated until the water becomes clear. The double-current apparatus, designed by Dr. Lockwood, I have not used, and I do not think the Kemp tube is desirable for use in children. In severe toxic cases, irrigation is always necessary to supplement the cathartics, and when it is necessary to use it so often it is unwise to attempt to pass the long tube, as it produces too much irritation.

FOOD.

In my opinion fresh milk should never be used in cases of intestinal toxemia until every trace of infection is gone, and it is my custom to use condensed milk, or malted milk, or other of the evaporated milk products, for several days after such an attack. A violation of this rule is apt to result in a reinfection, and such a relapse is often more serious than the original attack. Milk seems to be a common carrier for all pathogenic bacteria that infest the alimentary canal. There seems to be no doubt that it is the medium of infection in most cases, whether the poison comes from without or has its origin within. In either case the bacteria thrive and multiply with greater rapidity in the presence of milk, yet there are eminent authorities who hold the opinion that sterile milk is innocuous and may be used in such toxic cases. It is my rule to withhold it absolutely as long as there is any trace of the foul odor that obtains in these cases, and even long afterward. The following brief résumé of two cases will illustrate my experience on this point:—

R. S., two years old; in perfect health; digestion normal; had an acute attack; temperature 105°F. Also vomiting, urticaria, delirium. Bowels were moved with difficulty after repeated doses of calomel, followed by castoria. Then castor oil was given every four hours, and the bowels were irrigated until the temperature came down. Stools were very foul and consisted of milk curds and masses of mucus. Two days after the temperature had remained normal and the odor disappeared one milk feeding was given, which consisted of 2 ounces of milk to 4 ounces of barley gruel. Within twelve hours after this the temperature rose to 106°F., urticaria reappeared and the child was very sick; the temperature persisted for several days, fluctuating between 101° and 105° F. The child was stuporous most of the time, during which he was seen by Doctors Holt and Jacobi several times, and the diagnosis was in doubt. The persistent foul odor, however, and the recurrent urticaria finally removed all doubt. At the end of a week this second attack had subsided, leaving the child in a weak condition, from which it did not seem to rally. It had no appetite and was extremely apathetic. Two days later the temperature rose again suddenly to 105°F. There was a suppression of urine and the child died of acute Bright's disease. The urine had been examined during the first attack and found normal. In this case the nephritis was no doubt due to the profound toxemia, and I believe that the second attack and the Bright's disease would not have occurred if the milk had not been given.

J. A. M., twenty months; unusually healthy; child weighed

27 pounds; brought in from Princeton on a visit to his grandfather in the city. I was called in during the night and found him with temperature 105°F., twitching a good deal and apparently about to have a convulsion. I gave him a bath at once and washed out the bowels, using the high tube, which brought away a tremendous amount of foul-smelling material. This kept coming away in such quantities that it took me nearly an hour to empty the bowel. The temperature fluctuated for several days, and the child was so sick that I was obliged to sleep in the house one night. I do not remember the minutiæ of the case, but it was necessary to administer cathartics and irrigations several times a day, and at the end of a week the boy was quite convalescent, except that the frequent green discharges persisted, and I was obliged to resort to bismuth and an arrowroot diet. One evening, owing to some trouble in the kitchen, the arrowroot gruel could not be made, and we sent to the Home Bureau for a fresh supply. I did not give the order, but supposed, of course, that it was to be made with water and not milk. The boy had one feeding of the Home Bureau supply early in the evening; I think he took 6 ounces. About three o'clock in the morning I was summoned again and found him with a high temperature, nearly 105°F., vomiting, and just as ill as he had been during the initial attack. I was suspicious of the arrowroot gruel and, on examination, found that it had been made with milk. I was fortunate to get him cleaned out more quickly this time, and he recovered more rapidly, although he was very sick. I am sure that this relapse was not a mere coincidence, I have seen it occur too often, and it is incredible how very little milk is required to set up a reinfection and often serious trouble.

Opinions differ widely as to the proper diet in cases of this kind. As a rule, proteid diet is avoided and the preference given to farinaceous gruels. One pediatrist prefers beef juice and other beef products exclusively, but most authorities are afraid of it and all other foods containing proteids. In my opinion, a middle ground is advisable, although I would not hesitate to use broths alone. I prefer a mixture of equal parts of animal broth and cereal decoction. This seems to agree with most cases: Chicken, mutton or veal broth with equal parts of granum, barley or arrowroot gruels. The latter should be made weak, about 2 drams to the pint, and digested with cereo or some other form of diastase. The arrowroot is usually reserved for cases of diarrhea. In acute cases, however, it is much better to give no food at all, simply pure water, or, in cases of vomiting, albumin water, consisting of 1 dram of brandy, white of one egg, and 1 pint of water. Some writers object to this, as it often comes through undigested, but I never could satisfy myself that it produced irritation, and I use it in all cases. All nourishment should be given in small quantities, and interval enough allowed between feedings to permit of digestion, which, under these conditions, is always slow. In cases of very high temperature digestion of course is in abeyance, and all food should be avoided. As convalescence is established I do not hesitate to use malted milk, or condensed milk, the latter for little babies and the former for older children. It should be very weak at first—1 dram to 6, or even 8, ounces. The Eagle brand has been found pure and safe. It is best to get a fresh can every day. Malted milk to be used in exactly the same way. Nestlé's food and Eskay's food are also useful in the same proportions. In all cases of disturbed digestion in hot weather it is my custom to drop milk at once and rely upon one of the above products.

ENLARGEMENT OF THE LARGE INTESTINE IN CHILDREN.—Tschernow (*Jahrb. f. Kinderh.*, 1907, p. 341) reviews the history of Hirschsprung's "megacolon congenitum," summarizing the various cases that have been published and adding two from his own experience. He is convinced that the condition is not congenital, but is acquired from some obstruction. The various conditions causing the obstruction are generally located in the lowest segment of the sigmoid flexure, especially at its junction with the rectum. Treatment should include measures to empty the bowels temporarily with an artificial anus, and later entero-anastomosis, uniting the cavity of the sigmoid flexure or the upper part of the descending colon with the ampulla of the rectum. His 2 cases show the possible advantages of treatment on these principles. Another patient, a girl of four, thus operated on in 1904, is still in good health, and Björksten has had a similar experience in 1 case. In short, "megacolon congenitum" is not congenital, he declares, but acquired, and is amenable to treatment.—*Journal of American Medical Association.*

SOME ADVANCES IN INFANT FEEDING.*

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During the last ten or fifteen years there has been evolved in the United States a method of infant feeding which has been designated as the percentage method. This method has been perfected, taught, and, in a measure, popularized by Dr. L. Emmett Holt, of New York, and Dr. Thos. Morgan Rotch, of Boston, and their pupils.

The object of this method is to modify cow's milk so that it will resemble human milk in percentage composition, to lower the proteid percentage without at the same time reducing the fat percentage and to know the exact percentage amount of fat, proteid and carbohydrate in the milk mixture fed. The result has been a complicated system of formulæ, arranged to feed a definite percentage mixture and a definite amount, *according to age,* for each day, week, and month of life, without regard to the weight of child, or the actual amount of food necessary for each individual.

The many failures which have occurred in this method of feeding have been due largely to the fact that we have been dealing in percentages and not in actual amounts of food, that is, energy quotients; to false ideas of fat and proteid digestibility; and to too short intervals between feedings.

In this paper I wish to discuss briefly the calorimetric standard, the amount of food, the composition of the food and the intervals of feeding.

The calorimetric standard is the feeding each day of a definite amount of energy expressed in terms of calories for each pound of body weight. A calorie is the amount of heat necessary to raise the temperature of one liter of water 1°C., and is the universally recognized unit of measure of food value as expressed in terms of heat production.

In a steam engine the energy in the coal is changed into heat by burning and used to produce steam. Each pound of coal burned produces the same amount of heat, and therefore it has a definite fuel value. A large engine requires more coal than a small one. An engine uses more coal when running at a high rate of speed than at a slow rate, more fuel when it pulls a heavy load than when it pulls a light load.

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The human body, like the steam engine, must receive a certain amount of fuel each day to make it run. This energy appears as heat, pressure (in the circulatory system), motion, locomotion and animal electricity. A large man needs more food than a small man, a working man more than a resting man. The faster, the harder the work, the more the food required. Just as an engineer can calculate the amount of coal required to furnish a definite amount of power so can a doctor calculate the exact amount of food necessary to furnish the required energy to the body.

Numerous investigators (Chittenden, Atwater, Voit and Pettenkofer) have shown that a healthy man should eat an amount of food daily containing an energy equivalent of 18.1 calories for each pound of body weight. The body can metabolize food far in excess of this amount, but when any excess is fed, it is without value to the body and may do harm. It is eliminated by the lungs, kidneys and skin, causing these organs to do unnecessary work. For example, when a large proteid meal is given all the nitrogen may be recovered in from two to three hours in the urine in the form of urea. When the food does not contain the required amount of energy, the body will burn its own tissues to produce the deficit. The excellent health of the Japanese soldiers in the late war was due, in a large measure, to the fact that they were fed mathematically according to weight and work to be done.

Heubner, in Berlin, was the first to apply these principles to infant feeding, and he was quickly followed by Feer, Camerer, Hahner, Finkelstein, Czerny and Keller, and Budin. By a large number of observations made on healthy, breast-fed children, weighing them before and after each feeding, Heubner found that after the first few days they consumed daily an amount of milk equal to 45 calories per pound of body weight during the first three months of life; during the next three months from 40 to 45 calories daily per pound, decreasing gradually during the next six months, so that at twelve months they consumed daily 32 to 35 calories per pound of body weight.

Since Heubner's original work, numerous observations and metabolism experiments have been performed by the above-named men and others, and all agree with the results of Heubner. The step forward and the value of the calorimetric standard of feeding is that the individual child, and not a type, is fed. Each child is fed the same amount of energy per pound that the healthy breast-fed child of the same weight and development requires.

It does not make any difference whether the milk is prepared by the Walker-Gordon laboratory, the percentage method, the top-milk method, the milk and cream or the whole milk method, if the food agrees with the child and contains the correct energy quotient per pound of body weight.

The technique of the calorimetric standard is very simple, no matter what method of feeding is used. It is necessary to know only two things: First, how much energy is needed in twenty-four hours; second, the energy equivalent for fat, carbohydrate and proteid. The amount of energy necessary in twenty-four hours is, for each pound of body weight, 45 calories in the first three months; 40 to 45 calories in the second three months, gradually decreasing to 32 to 35 calories per pound at twelve months.

The energy equivalent of 1 gram of fat is 9.1 calories
“ “ “ “ 1 “ “ carbohydrate “ 4.1 “
“ “ “ “ 1 “ “ proteid “ 4.1 “

First determine from the body weight the number of calories required and then feed a mixture which the child can digest and which contains this number of calories. A child weighing 10 pounds, three months old, would require ten times 45 calories, or 450 calories in twenty-four hours. To determine the number of calories in a mixture is a simple problem in arithmetic. Multiply the amount of each ingredient used in twenty-four hours by its fuel value, add the products, and the total is the energy quotient. When whole milk dilutions are used, the calculation is simpler than when other methods are used. Multiply the number of ounces of milk in the mixture by twenty-one (the number of calories in an ounce of milk) and add enough carbohydrate (1 ounce = 120 calories) or cream (1 ounce 16 per cent. cream = 54 calories) to make up the energy content. The following table shows the energy quotients of different materials used in infant feeding:—

1	quart	of	whole	milk	contains	690	calories
"	"	"	⅔	"	"	460	"
"	"	"	½	"	"	350	"
"	"	"	⅓	"	"	230	"
"	"	"	butter	"	"	650	"
"	"	"	skim	"	"	320	"
"	ounce	"	"	"	"	10	"
"	"	"	whole	"	"	21	"
"	"	"	16% cream		"	54	"
"	"	"	carbohydrate		"	120	"

The calorimetric standard is not a method of feeding. It is a check upon all methods of feeding. It can be applied to any method and its value is indispensable to any one who feeds babies. It is not merely an interesting problem in physiology, but is intensely practical, for it is the only way of determining with any degree of accuracy the approximate amount of food the infant needs in twenty-four hours. And, after the amount of food needed is determined, it is the only way to tell whether the child gets that amount or not. It prevents long periods of underfeeding and prevents overfeeding, which is as dangerous as underfeeding. In fact, one of the greatest dangers is overfeeding, and if the formulæ of Holt and Rotch are followed overfeeding is almost always the result. By overfeeding I do not mean a mixture containing too high fat and proteid percentage or at too frequent intervals or too great a volume in twenty-four hours, but I mean an amount in twenty-four hours of fresh, clean, properly modified cow's milk, which contains more than the required number of calories for each pound of body weight.

Joseph Brenneman, instructor in pediatrics at Northwestern University, has an excellent article on this subject in the *Journal of the American Medical Association* of April 20, 1907. He has reviewed the histories of all of his cases at the Northwestern Medical School and in his private practice fed according to the percentage method of Holt. In all cases he had a complete record of the exact amount and strength of the cream, milk, sugar and diluent used, and by calculating the energy equivalents of the different ingredients, he was able to tell the exact number of calories per pound he had been feeding. He found that all his cases had been overfed, many receiving 55 to 60 calories per pound, and that some received 90 calories and 1 case 135 calories per pound for two weeks.

The symptoms of overfeeding form an easily recognized, distinct clinical picture, and are in a large measure caused by overfeeding with fat. The infant becomes cross and especially at night the sleep becomes restless and broken. At the same time it becomes constipated in a very characteristic manner. The stools that were soft, yellow and moist become pale, gray, hard and dry. They will not mix with water and are the color and consistence of putty. They roll from the diaper leaving it unsoiled. The odor is strong and fetid. The urine has an ammoniacal odor and is irritating. The appetite becomes poor and part of the food is uneaten each time. The child becomes pale and pasty. The tissues lose their tone, the muscles become flabby, the abdomen becomes soft and is distended with gas. The child becomes less active and plays less. It fails to gain in weight on the same food or a larger quantity of food, which, up to this time, has produced a normal, or greater than normal, gain in weight. If the food is still further increased in amount and strength, the child not only does not gain, but loses weight. This may continue until the child becomes marantic, and a familiar picture to us all is the emaciated, atrophic child, who eats and digests enormous quantities of milk without diarrhea or digestive disturbance and still steadily loses weight.

Other results of overfeeding may be seen in the acute gastrointestinal disturbances with vomiting, diarrhea, prostration and inability to again take cow's milk for a long time. Another symptom is the eczema, which comes as small, rough, reddish spots on the cheeks and may spread all over the face and scalp. I wish to state again that these symptoms are in a large measure due to the fat, and not so much to the high percentages of fat as to the total quantity in twenty-four hours. Briefly, the clinical picture of overfeeding is restlessness, anorexia, pallor, pasty skin, flabby muscles, fat constipation and stationary or decreasing weight.

Brenneman's conclusions since he has been calculating energy quotients agree with those of the German pediatrists that few, if any cases, require more than 45 calories per pound of body weight, and if this amount is exceeded it is usually regretted. He says: "I am positive that in our past overfeeding has been a factor in the production and maintaining of nutritional disturbances in infants that towers above all others."

The volume of food in ounces to be given each day is as important as the energy quotient. The artificially-fed child should not receive a greater number of ounces in a day than the healthy child nurses from the breast. Large quantities of very dilute food containing the correct energy quotient are as harmful as the smaller quantities containing too large an energy quotient. The large volume of very dilute food necessary to give the required energy equivalent leads to short intervals between feedings or to too large amounts at each feeding. The large volume of liquid food floods the tissues with enormous quantities of water, increases the water metabolism, the work of the lungs, kidneys and skin. It leads to profuse sweating and frequent micturition, which tend to cause irritation, maceration, and even infection of the skin.

The quantity of food in ounces must be adjusted to each individual child, and a good plan to follow is to feed volume according to weight just as we feed total energy according to weight. By a large number of observations made by Finkelstein and others, it has been shown that during the first ten days the average healthy breast-fed child drinks daily a quantity equal to about one-fifth of its body weight; from the second week to the third month about one-sixth of its body weight daily; from the third to the sixth month, one-seventh; from the sixth to the ninth, one-eighth, and from the ninth to the twelfth month, one-ninth of its body weight daily. Expressed in total quantities the average normal infant should take:—

1st day	no milk	
2d day	60- 80 c.c.	2- 2½ ounces
3d and 4th day	200 “	7 “
5th day	300- 350 “	10-12 “
10th day	400- 450 “	14-15 “
3d week	500 “	16-18 “
2d month	600- 700 “	20-24 “
3d month	700- 900 “	24-30 “
4th to 12th month	1,000-1,100 “	32-35 “

The total quantity should never exceed 1,100 to 1,200 c.c. (35 to 38 ounces) in twenty-four hours.

The interval between the feedings is another important factor in infant feeding. For years one text-book after another has advised two-hour intervals. The stomach of a healthy breast-fed child is generally empty two hours after a feeding. But as Jacobi says: "Why feed every two hours? Why not feed every two and a half or three hours?" "If the child is able to go longer intervals at night, why not in the daytime?" In artificially-nourished children longer intervals are of more importance than in breast-fed children, because it takes from two and a half to three and a half hours or longer for the stomach to empty itself after a meal of cow's milk. The remnants removed from the stomach two hours after a feeding consist mostly of fat and proteid, and it may be supposed for infants what Cannon has shown on animals, that fat delays the discharge of food from the stomach and is itself the last to be discharged.

Food should not be put into the stomach until the previous meal has been discharged into the duodenum, and two-hour intervals are too short for artificially-fed children. The interval in artificially-fed children should never be less than three hours, and experience has shown that four-hour intervals after the first few months should be the rule.

The following table is a schedule of feeding for the average healthy child, showing the interval, the number of feedings and the volume in twenty-four hours. The energy content must be determined by the weight of the individual child.

	Number of Feedings.	Interval.	Amount of each Feeding.	Total quantity in twenty-four hours.
1st day	0	0	0	0
2d day	4	4	15-20 c.c. ½-⅔ oz.	60-80 c.c. 2-2⅓ oz.
3d to 4th day ...	7	3	30 c.c. 1 oz.	200 c.c. 7 oz.
5th day	7	3	45-50 c.c. 1½-1⅔ oz.	300-350 c.c. 10-12 oz.
10th day	7	3	55-65 c.c. 1⅚-2⅙ oz.	400-450 c.c. 13½-15 oz.
3d week	7	3	70 c.c. 2⅓ oz.	500 c.c. 16⅔ oz.
2d month	7	3	85-100 c.c. 2⅚-3⅓ oz.	600-700 c.c. 20-23 oz.
3d month	6	3½	110-150 c.c. 3⅔-5 oz.	700-900 c.c. 23-30 oz.
4th to 12th month	5	4	180-220 c.c. 6-7½ oz.	900-1,200 c.c. 30-40 oz.

Foods having a great diversity of chemical composition have been recommended for the artificial feeding of children, and each food has had its staunch supporters, which shows that the infant can adapt itself to a great variety of conditions and still thrive and grow. Cow's milk, either pure or modified, is the most universal substitute for breast-feeding.

Biedert, in Germany, and the American School of Pediatrists, believing the proteid to be the disturbing element in artificial feeding, have sought to overcome this difficulty by diluting milk to reduce the proteid and adding fat to increase the strength of the mixture. Experience has shown that the infant will thrive and grow on these cream mixtures not only during the first few weeks, but during the entire first year, but feeding of large amounts of fat is accompanied by grave dangers. The amount of fat which can be digested and absorbed by the healthy child is not very large and lies within very narrow limits. Even when simple dilutions are used without the addition of cream, and in which the fat percentage is low, it is not rare to find fats, fatty acid or soaps in the stools.

Fat may appear in the stools of breast-fed children, and a large majority of the cases of constipation seen in these cases are due to too much fat.

In sickness the fat digestion is the first to suffer, and the appearance of fat in the stool of normal healthy children is often the first sign of approaching illness.

In 1904 Holt reported 5 cases to the American Pediatric Society in a paper entitled "Disturbances of Digestion in Infants Resulting from too High Fat Percentages," in which he showed that fat may cause habitual vomiting, diarrhea, constipation and convulsions. Brenneman, in his analysis of these cases in his article on overfeeding, has very clearly shown that it was not so much the high percentage of fat as it was the large amount of fat that was the cause of these conditions, and, as he points out, the difference between percentages and amounts, slight as it may seem, is the essential conception in infant feeding. It should be not percentage of ingredients, but amount in twenty-four hours.

Finally, excess of fat may produce an acidosis varying in degree from an increased output of ammonia in the urine without objective symptoms of intoxication to a condition of complete coma. The fat of cow's milk, on account of the lower fatty acids it contains, yields on hydrolysis a larger percentage of diacetic acid and acetone than the fat of human milk, and for this reason may more readily produce acidosis.

I wish to report briefly 2 cases to illustrate acute intoxication by fat. The first was in the Charité Children's Hospital in Berlin. A female child of four months was brought into the dispensary suffering with a severe case of cholera infantum (hydrencephaloid). It was comatose and in a condition of extreme collapse. After seven days of treatment and feeding it was convalescent. On the seventh day Dr. Langstein showed the child to the class of American physicians, and said that up to that time the child had received as nourishment only fat-free mother's milk.

He said that our practice of feeding whey-cream and cream-barley-water mixtures in the convalescence of these cases was wrong; that the fat was the direct cause of death in these cases, and that the proteid was not harmful. In order to demonstrate this, he would feed the child the next morning one feeding of mother's milk. The next afternoon he showed us the child again, and it was in a condition of collapse as extreme as when first brought to the hospital. That the fat was the cause of the condition was evident, because on the previous day we had seen the child happy, smiling and convalescent on a diet of centrifuged fat-free mother's milk.

A trial of the fat-free diet in acute intestinal disturbances will convince you, as this demonstration convinced me, that fat in these conditions is the element to be feared.

The second case, M. H., female, age three months. She was bottle-fed from birth with Eskay's food, Nestlé's food and, finally, condensed milk. When I first saw her, on June 29th, she weighed 7½ pounds, which was also the birth weight. She was pale, anemic, emaciated and had daily six to eight greenish stools containing mucus, but no pus or blood. After the usual preliminary treatment of calomel and starvation for thirty-six hours, she was fed on the morning of July 1st a milk mixture of one part milk and two parts water containing the required energy quotient. In the afternoon collapse, coma, convulsions and high temperature occurred, and only the most heroic treatment prevented death. Convalescence was established on a diet of buttermilk, which is almost fat free. After five days we were unable to obtain good buttermilk, and the diet was changed to a one-third skim milk and Mellin's food mixture, which was gradually changed to a one-third milk and Mellin's food mixture. On July 15th, the child was taken to the country, where the hygienic conditions were better, and on the next day it was given as usual the one-third milk mixture, but the milk had been obtained from a Jersey cow and contained a very high per cent. of fat.

The child became ill during the night, and at 4:30 A.M. went into a convulsion. At 8:30, when I saw the child, it was still in the convulsion. It was rigid, but the arms at times showed clonic movements. The head was drawn back, the skin was cyanotic and inelastic, the pulse imperceptible at the wrist. The fontanels and eyes were sunken and the temperature was 93°F. She was, in fact, moribund. Under heroic treatment, consisting of transfusions of normal saline, adrenalin (6 ounces), hypodermic injection of camphor and digitalis, hot mustard baths and packs, washing out the stomach and bowels, 10 grains of chloral and 40 grains of bromid by enema, the rigidity disappeared at twelve o'clock. After twenty-four hours of continued stimulation the child regained consciousness, but was too weak to swallow. One ounce of skim milk, diluted with 1 ounce of boiled water and peptonized for ten minutes, was fed every two hours by stomach tube for thirty-six hours, when it was again able to nurse from the bottle. Convalescence was established on a skim milk and Mellin's food diet.

I wish also to report 2 cases of chronic constipation due to too much fat.

FIRST CASE.—On February 1, 1907, I was called to see J. G., female, age twenty-two months, who was suffering with chronic constipation. She had been treated for six months with drugs, enemas and suppositories without results. The diet consisted almost entirely of cow's milk, and the fat had been increased to 10 or 12 per cent. in the hope of relieving the constipation, but it had become steadily worse. She received five feedings of 8 ounces each. The stools were the typical pale gray, dry, hard, fetid variety, composed almost entirely of calcium soaps, fatty acids and fat. She was given high enemas of olive oil when necessary to soften the fecal masses in the colon and sigmoid and put on a diet of skim milk, three feedings of 8 ounces each, and containing a large amount of maltose..

The diet also contained fresh green vegetables, such as spinach and lettuce, fresh fruit juices, prune juice, meat juice, zwieback, crackers, potatoes, bread, gravy and eggs. The recovery was rapid and uninterrupted.

SECOND CASE.—August 28th, M. N., female, age one year, weight 19 pounds, pale, flabby, cross, sleep restless and broken. The appetite was poor, the bowels constipated and the stools pale gray, dry, putty-like and had a very strong odor. They were sometimes mixed with mucus, but more often accompanied by mucus. The urine had a strong ammoniacal odor. There was a spot of eczema on the left cheek about three-fourths of an inch in diameter. The diet had been: whole milk, 32 ounces; water, 16 ounces; Mellin's food, two tablespoonfuls, six feedings of 8 ounces each; total quantity, 48 ounces. The mixture contained 810 calories, or 43⅓ calories per pound of body weight, or one-third more than required.

The food was reduced in volume to 35 ounces, five feedings of 7 ounces each, the percentage composition remaining the same. Energy quotient, 600 calories. Improvement for two days, then conditions as bad as ever. The intervals, volume and energy content were correct, so it must have been some ingredient in the food that was wrong. I now instructed the mother to dip 4 ounces out of the top of each pint bottle of milk after it had stood from three to four hours, then mix the remainder of the milk with 11 ounces of water and add four tablespoonfuls of Mellin's food, five feedings of 7 ounces each. To this diet was added fresh fruit juice, cooked fruit juice, meat juice and mashed potatoes. The child has had every day since this mixture was given one or two voluntary soft, yellow movements free from mucus.

Our method of infant feeding is based not only upon the different percentage of proteid in human and cow's milk, but upon the theory that the casein of cow's milk is digested with difficulty. This theory of proteid indigestibility was accepted because cow's milk forms a firmer clot in a test tube when submitted to the action of rennin, because of the presence of curds in the stools which were supposed to mechanically irritate the bowel, because cow's casein is a foreign albumin and has a toxic effect when fed to man, and, lastly, because it was thought to undergo putrefaction in the alimentary canal.

It is true that in a test tube rennin coagulates the casein of cow's milk, forming a firmer clot, but this does not show that it makes it more difficult to digest, and the firm coagulum may be overcome by using gruels or cereal waters for diluents.

The dirty white yellowish lumps or curds in the stools, which we have been taught to believe were proteid remnants, in a large majority of cases are not proteid at all, but are calcium soaps, fatty acids or bundles of fat needles. This can be demonstrated by microchemical examination or clinically by changing the diet to a fat-free food without altering the proteid content.

Dr. Frank Walls (*American Medical Journal,* April 27, 1907) has fed sterile, fat-free, undiluted cow's milk, at times giving 1 quart in twenty-four hours to over 200 babies. After careful examination, he has never found any curds in the stools. Among these 200 cases were 3 suffering with ulcerative ileocolitis, 3 with hereditary lues, some were premature and some atrophic.

The theory that the foreign albumin (the casein) had a toxic effect was disproved by Finkelstein, who has fed 10 grams of pure casein in tea at one feeding without the slightest signs of poisoning. That the casein is not toxic is further shown by the fact that in Holland the children are raised upon buttermilk, which contains all of the casein.

That casein does not undergo putrefaction in the intestinal canal has been proven by the researches of Wegscheider, who has never been able to find either leucin or tyrosin in the stools of milk-fed children, and by the researches of Senator, Uffelman, Winternitz and Blaugberg, who say that the feces of healthy, exclusively milk-fed children do not contain a trace of indol, skatol, phenol or cresol.

Since the limit to the assimilation of fat is so narrow and the dangers of overfeeding are so great, the question of the usefulness of the carbohydrates becomes a very important one. It has been shown, both in adults and children, that the carbohydrates, as well as fats, may replace a part of the proteid in the food. It has further been shown that the carbohydrates do this at a less expense to the body than do fats. They are digested more easily, some requiring no digestion at all. They are oxidized more readily in the body and require a smaller amount of oxygen to yield their energy, as they contain enough oxygen in themselves to oxidize all their hydrogen.

There is a great diversity of opinion as to the amount, and the kind of, carbohydrate which may be used to the best advantage by the body. This brings into consideration the sugars, dextrins and starches.

Of the sugars, maltose, cane sugar and milk sugar are the only ones that need be discussed. Maltose, from a physiological standpoint, should be the most useful, as it can be absorbed without further digestion and can be assimilated in much larger amounts than the others without producing glycosuria. Its fault is that it produces diarrhea very easily.

Cane sugar does not undergo bacterial decomposition as easily as milk sugar, but, like maltose, it produces diarrhea. It is very sweet, and children fed with cane sugar are very hard to wean. Both cane sugar and maltose in isodynamic quantities are greater growth producers than milk sugar, which may be explained by the fact that milk sugar undergoes more bacterial decomposition in the alimentary canal. The bacterium lactis aerogenes, which is present in great numbers and almost pure culture in the small intestine, hydrolizes milk sugar to lactic acid, carbon-dioxid and oxygen without forming any galactose or dextrose, and, consequently, just the amount of sugar is lost to the body that is destroyed by the bacteria. Milk sugar is very valuable because it can be fed in relatively large quantities without producing diarrhea, and this fact has made it the most popular of the sugars.

Dextrin is a soluble carbohydrate and is formed from starch by the action of heat or by a diastatic enzyme. It is a transition form between starch and maltose. It has the same value to the organism as maltose and does not produce diarrhea. In fact, when fed in large doses it causes constipation. By actual experiment it produces greater growth (in equal quantities) than does milk sugar. Dextrin, combined with maltose in such a proportion that the laxative action of the maltose overcomes the constipating action of the dextrin, would be, theoretically, the best carbohydrate. Such a food is made in Germany and sold under the name of Soxhlet's Nährzucker. Heubner, of Berlin, the former champion of milk sugar, now uses this preparation almost exclusively, and says it can be fed up to 10 or 12 per cent. without producing any untoward symptoms. One of our own well-known infant foods contains $49^9/_{10}$ per cent. maltose and $37^9/_{10}$ per cent. of dextrin, and may be used to excellent advantage as the carbohydrate in our milk mixtures.

Experience has also shown that overfeeding with carbohydrate causes as great catastrophes as overfeeding with fat. Too much carbohydrate may lead to severe cholera-like diarrhea with grave general symptoms, and also to chronic metabolic changes like rickets and anemia. This fact has led to a general condemnation of the carbohydrates, and especially the starches, as an aid to the artificial feeding of children. In the adult starches form a very important part of the diet, but for years it has been forbidden to children. And why? Because Zweifel found unchanged starch in the stomach of a child that had been overfed with starch, and Korwin pointed out that though the saliva of the infant contained a small amount of starch-digesting ferment the pancreas did not. From these two researches it was generally accepted that the infant could not digest starch until the eighth or tenth month, and even to-day this view is taught in our best American text-books, Kerley excepted. Heubner, Montague and Schilling have shown that the saliva does have a very active diastatic action on starch, and Cannon has shown that salivary digestion does not stop in the mouth, but is continued in the stomach until the presence of free hydrochloric acid stops the action of the ptyalin. In artificially nourished children free hydrochloric acid does not appear in the stomach until one and one-half to two hours after a meal. Moro and others have shown that a diastatic enzyme is present in the pancreas at birth, and while not present in very large amounts, it soon becomes very active if starch is fed. This may be explained by the researches of Pawlaw, in St. Petersburg, who has shown that the secretion of the pancreas and other digestive glands depends upon the food. A food rich in proteid causes a secretion rich in proteid-digesting enzyme, while a food rich in starch calls forth a secretion rich in starch-digesting enzyme. Clinical demonstration shows that when starch is fed in proper doses none appears in the stools.

Finkelstein says that the addition of the starches to the milk is not only permissible, but to be most highly recommended, both in early infancy and later, because the starches (gruels) cause a finer coagulation of the casein in the stomach, relieve constipation, fat soap stools and the mucous, curdy stools, which are often present in simple milk dilutions; also because of its proteid-sparing power and greater resulting growth in equal amount with sugar.

Before leaving the subject of the composition of the food, I wish to say a few words about buttermilk. Good buttermilk contains about 0.5 to 1½ per cent. fat, 3 to 3½ per cent. sugar, and 2½ to 2$^7/_{10}$ per cent. proteid. To a liter of buttermilk is added a tablespoonful of flour and three tablespoonfuls of cane sugar. It is then slowly, with constant stirring, heated to boiling, allowed to cool and then twice again brought to boiling. In this form it is very palatable and contains as much nourishment as whole milk. It is very valuable as a food in acute intestinal disorders, especially the acute gastrointestinal dyspepsia, for which it is almost specific, but its value as a food for the entire period of infancy has not yet been sufficiently proven.

Up to the present time, no food has been devised so perfect that we have ceased to look for a better one. In France, Budin, Chavanne and others feed undiluted cow's milk. The Hollanders feed buttermilk, the Germans believe the fat to be the disturbing element and so feed low percentages of fat and high percentages of carbohydrate. In America we have been taught that the proteid is the harmful element, so we feed low proteid percentages. We have tried to get a food whose percentage composition approximated human milk.

In my opinion the problem of the correct food for the infant will not be solved until the theory is abandoned that the best food is the one whose chemical composition most closely resembles human milk. Past experience has not proven it to be true, and the fact that in sick and delicate children the best results are obtained with a food whose composition is widely different from human milk shows the theory untenable.

The idea should not be to get a chemical composition like human milk, but to get a food, regardless of composition, which has shown by actual experience results which most closely resemble the results of breast-feeding. It is the results like breast-feeding that we want, not chemical composition like breast milk. This food cannot be determined in the chemical laboratory, but can only be derived in one way, and that from the analysis of an enormous number of carefully recorded clinical cases fed and followed into the second and third year.

The feeding of undiluted milk to young infants has not met with popularity except in France and by one or two German pediatrists. The buttermilk used so extensively in Holland has not been generally accepted for a permanent food. Its small fat content makes it an excellent food for periods of short duration, but the mass of clinical evidence so far collected is not enough to be positive of its value as a permanent food.

The percentage method is very complicated both for the physician and mother, and if our present formulæ are followed very closely there is great danger of overfeeding. Dr. L. Emmett Holt, one of the most ardent advocates of the percentage feeding, says now that, "Although desirable in difficult cases, it (the percentage method) is not necessary to obtain excellent results in a great majority of infants, and a certain adjustment of a healthy infant to its food is soon secured."

Dilution of whole milk with water or sugar solution is sufficient in a great majority of cases, but the energy quotient of these mixtures is so low that it requires too great a volume of food.

What, then, is the best artificial food for an infant? A year ago the pediatrists of Europe held their annual congress at Stuttgart, and each nation chose a man to represent it on a committee to determine the best artificial food for the infant. The committee met, and each man in turn said he did not know; and they reported to the congress that they did not know the *one* best artificial food for the infant, and nobody knows the one best food. No one food and no one method can be applied indiscriminately to every case. The composition of the food must be determined for each individual child. The value of the calorimetric method is that it checks up all methods and allows you to feed intelligently the correct amount of food.

I have shown the grave dangers of too much fat. I have emphasized the value of dextrins and starches. I have demonstrated that the proteids are harmless and that they are not hard to digest. I have explained why the intervals should be three hours or longer. I have pointed out the dangers of overfeeding both in energy quotients and volume, and that the danger is not so much due to high percentages as to too great amounts in twenty-four hours.

The following is a method which avoids extremes, which is easily carried out and which will be found applicable in most cases. Simple dilution of pure whole milk with water until it can be digested by the infant and the addition of a carbohydrate to make up the energy quotient to the required number of calories. Starting with a dilution of two parts water and one part milk (one-third milk) increase the percentage of milk as fast as the child can digest it, aiming to reach one-half milk by the middle of the second month. During the second and third months increase the percentage of milk still further, so that by the fourth month two parts milk and one part water are given. Keep the child on this two-third dilution until the eighth month, increasing the amount fed, but not the percentage composition.

From the eighth month gradually increase the percentage of milk, so that at one year the child takes whole milk. It is seldom necessary to start with a greater dilution, but it may be advisable at times to feed whole milk by the eighth month. The stools and the weight curve are the sign posts. The carbohydrate to be added is preferably a dextrin-maltose mixture, because it possesses all the good qualities of the starch, requires but little digestion and can be given in larger amounts without danger. Its one disadvantage is the expense.

In the second and third months a small amount (1 dram) of properly prepared starch, in the form of wheat flour, barley or oatmeal, should be added. This amount to be gradually increased each month, so that when the time arrives for the child to take a mixed diet, its starch-digesting power will be well developed. The feedings should be three hours apart during the first three months, and after the fourth month four hours apart. The volume depends on the weight of the child and should be in the four quarters of the year, respectively, one-sixth, one-seventh, one-eighth and one-ninth of the body weight. It should never exceed 36 to 38 ounces.

During the first three months the food should have a fuel value of 45 calories per pound of body weight. During the second three months 40 to 45 calories per pound, and during the second half year the fuel value should gradually decrease, so that at twelve months it is 32 to 35 calories per pound of body weight.

As an example take a six months' infant weighing 15 pounds. A volume of one-seventh of the body weight would be 33 ounces. The strength at six months two-thirds milk, the whole to contain 40 to 45 calories per pound, or an average of 640 calories.

22	ounces	milk	460 calories
11	"	water	
1½	"	carbohydrate	180 "
Salt			
			640 "

Five feedings of 6½ ounces at four-hour intervals.

I wish to emphasize that this is only an example. One 15-pound child may be satisfied with 30 ounces of food, another requiring 35 ounces of food, but it should never be more than 35 ounces or less than 30 ounces.

One 15-pound child may make a steady gain on a food containing 600 calories (40 calories per pound), while another will require 675 calories (45 calories per pound) to make a steady gain in weight.

Twenty-two ounces of whole milk may produce the green, curdy, soap stools or fat constipation. Then the amount of whole milk should be reduced and either skim milk or carbohydrate added. One and one-half ounces of carbohydrate may produce diarrhea or constipation, depending on the carbohydrate used. This may necessitate a change of carbohydrate or a reduction of the carbohydrate and the addition of cream or whole milk or skim milk. And here again is where the calorimetric method is of value. The composition of the food must be varied to suit the idiosyncrasies of the individual child, but it must be varied in such a manner that the twenty-four-hour quantity of food still contains the required energy quotient, always remembering that for each pound of body weight a definite number of calories should be fed.

Time forbids the discussion of the whey dilutions and also the difference in reaction, ash, soluble albumins, the ferments, antitoxins, precipitins and immunizing substances in human and cow's milk. Also the discussion of pasteurization and sterilization. I would advise the use of pure raw milk, because sterilization changes the sugar to caramel, coagulates the albumin, changes the casein, changes soluble calcium to insoluble calcium, which prevents the perfect action of the rennin, throws the fat out of emulsion, splits the lecithin, changes a part of the organic phosphorus to inorganic phosphorus, and forms hydrogen-sulphide. Clinically, this "dead" milk is prone to produce scurvy or rickets.

In conclusion, I wish to emphasize again that:—

(1) The most important thing in infant feeding is to know the exact amount of food the child receives in twenty-four hours. The only way to do this is to calculate energy quotients.

(2) The percentage method is uncertain, complicated and unscientific.

(3) Feed amounts, not percentages.

(4) Overfeeding is one of the most common causes of nutritional disturbances in children, and is a distinct clinical entity.

(5) Fat is the element in cow's milk to be feared.

(6) Fat produces constipation, proteids never do.

(7) The curds in the stools are not proteid, but calcium soaps, fatty acids or fats.

(8) Casein is not difficult to digest, does not produce digestive disturbances and does not undergo putrefaction in the intestinal canal.

(9) The newborn infant can digest starch.

(10) Dextrins and starches are the most valuable adjuncts to milk feeding.

(11) The volume of the food should depend on the weight of the child and never exceed 36 to 38 ounces.

(12) The interval between feedings should never be less than three hours and after three months four hours.

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SMALLPOX.—Bancroft (*Southern California Practitioner,* February, 1907) reports on 700 cases of smallpox seen by him during an epidemic which occurred in Boston in 1901. Of the total number of cases, 18 per cent. occurred in patients under five years of age, while only 3 per cent. of the patients were between six and ten years. The next largest number of cases, 114, occurred in individuals between the ages of twenty-six and thirty. All the patients under the age of ten showed either no vaccination or a doubtful one. As the effect of compulsory vaccination wears off the number of cases gradually increases, which accounts for the 16 per cent. occurring between twenty-six and thirty years. These cases further showed that a fatal case of variola does not occur after a recent successful vaccination, and that vaccination also has an effect on the length of sickness. On analysis of the cases that terminated fatally and in which vaccination was established, it was found that the youngest patient was twenty-eight years old, and the average was forty-seven years. The 8 per cent. of mortality in these cases compares favorably with the 26 per cent. mortality among the unvaccinated. Bancroft affirms his belief in the absolute power of vaccination to prevent smallpox.—*Journal of American Medical Association.*

SANITARY MILK.*

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Toward the latter part of last century the attention of physicians was drawn to the fact that the infant mortality in summer far exceeded that of winter. And, upon investigation, they believed that the milk supply was largely responsible for this condition. With the advance of bacteriology it was found then that these minute organisms are responsible for the decomposition of milk. In order to avoid this trouble it was then advised to sterilize the milk, and dairies undertook to do this on a large scale. This, however, complicated matters in another direction, the principal disadvantage being that heat influences the composition of milk to a large extent.

From a physical point of view we find that, though the clumps of fat separate largely, the individual fat globules coalesce. This renders the emulsion coarser in nature and, since fats have to be emulsified for digestion, the digestibility of milk is impaired by sterilization. From a chemical point of view we find that the casein coagulates slower. Since coagulation is the initial step in digestion, the digestibility of casein is impaired. Soluble calcium salts and phosphates are rendered insoluble. The lactalbumin, the most soluble and valuable nitrogenous food material in milk, is largely, if not entirely, precipitated by boiling. Galactase and other enzymes are rendered inactive, although of late years doubt has been thrown upon the existence of such in fresh milk. It is also difficult to avoid the formation of a membrane which is difficult of digestion. Finally, we have the appearance of the caramel color and the accompanying so-called cooked taste. Both the appearance and the taste are extremely disagreeable to some people.

From the bacteriological standpoint, the changes are more important than from either the chemical or the physical. Although, theoretically, vegetative forms of bacteria are killed at far below the boiling point of milk, the fact is that a few may escape, especially if the above-mentioned membrane, which seems to protect them from destruction, forms. It is true, also, that the spores of bacteria largely escape destruction. And these spores will develop subsequently, cause decomposition of the proteids in milk and render the milk unfit for use. The so-called lactic acid bacteria are very sensitive to heat, are consequently destroyed by boiling and do not, therefore, prevent putrefying bacteria from exerting their detrimental influence. We cannot, therefore, consider the so-called sterilization of milk sterilization in the modern accepted bacteriological sense.

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* Read, by invitation, before the Chicago Pediatric Society, January 21, 1908

These disadvantages of sterilizing milk have been partly obviated by the next step—so-called pasteurization. Pasteurization of milk, as understood today, means the heating of milk to from 145° to 165° F., which insures the complete destruction of at least the pathogenic bacteria. The chemical and physical changes are not nearly so pronounced as they are by the process of sterilization. In fact, by careful treatment and rapid cooling of the milk to below 50°F., these changes may be so slight as to escape observation.

From a bacteriological point of view, however, the disadvantages of treating milk by heat are more pronounced after pasteurization than they are after sterilization. The vegetative forms of bacteria escape destruction to a larger degree and spores are probably not influenced at all, so that putrefaction sets in very readily. I should, therefore, not consider pasteurized milk fit for consumption after a lapse of twenty-four hours. The products of these spores after germination, as established by Flügge, are more or less poisonous to animals.

I do not wish to depreciate the value of pasteurization if properly executed. The one great advantage remains, and that is the security from pathogenic bacteria. But in how many cases do we obtain pasteurized milk which is properly treated? I have seen a pasteurizer at work in a large dairy, the milk of which escaped at a temperature of slightly above 120° F., and when asked for an explanation the proprietor informed me that the proper temperature of 165° would be reached in a few minutes. Admitting, then, that the bulk of the milk has been pasteurized, still a small part of it has not been pasteurized, and this contains nearly the original number of bacteria, which, since milk is an excellent culture medium for bacteria, will multiply at an extraordinary rate. Not only this, but, as stated before, the lactic acid bacteria, being very sensitive to heat, have undoubtedly been largely destroyed, giving the putrefactive bacteria full sway. Such milk may retain its sweet taste and clean, good appearance for a number of days, but may harbor deadly poisons, which are especially harmful to the delicate digestive tract of the infant. These disadvantages of pasteurized milk were readily recognized among scientists and substitutes were devised, among which I may only mention the so-called formalinized milk of Behring, the peroxide milk of Much and Römer, and others, the application of which, however, has been by no means satisfactory.

During the last few years, it has been shown possible to produce a clean milk which contains a relatively small number of bacteria, and which will keep sweet for a number of days. For example I may state that I have tasted such milk here in Chicago which was two weeks old and perfectly sweet to the taste; that in 1901 milk was shipped from this state to the Paris Exposition, which remained perfectly sweet for twenty-one days, to the great surprise of the French people. Others have claimed to have preserved milk sweet for even longer periods than those mentioned. It requires special care to obtain such results, however, and since milk is always consumed within one or two days, it is unnecessary to go to such extremes.

The demonstration of the possibility of producing milk which will keep almost indefinitely has acted as a stimulant to the production of clean milk, and we have now in this country and in European countries a number of model farms which make it a business to produce such milk. "Certified" in this state and in this city has no meaning, except as it is arbitrarily given by the producers. In several eastern cities medical societies, or some other body of scientific men, have granted their endorsement to those producers who have expressed their willingness to comply with some rigid conditions of production imposed upon them by the certifying body. In the West, the only city that I know of where this is done is Milwaukee. The medical society of Milwaukee has a contract with a neighboring farm, a contract which embodies the necessary conditions for producing good milk and also makes a great many fantastic demands.

I believe, however, that milk can be produced in a satisfactory condition at a somewhat lower price than certified milk is sold for today and still be equal, or nearly equal, to this in quality. The model farms, as a rule, do not pay. One of the reasons is that they are run on an extreme plan. They are exceedingly particular about the food material which is given the cows. A great deal of time is spent in buying material, measuring it out and weighing it before the cows are fed. I see no reason why cows which are treated well, kept clean, get healthful food so as to preserve their general condition, should not produce a satisfactory milk. As an example, to show the methods which are used to produce clean milk, I will mention a rather amusing incident. A German philanthropist not only had his men put on washed duck suits for milking, but had white gowns made for his cows, so as to prevent dust and dirt from falling into the pail during the process of milking. It is hardly necessary to state that the milk was satisfactory, but as a financial venture the enterprise was a failure.

However, eliminating some of these unnecessary precautions, I believe it is possible to produce sanitary milk much cheaper than it is produced today. It must not be forgotten that when cows are treated as they should be treated, when they are treated as they are in model dairies, and not as is the habit of farmers in general, they will produce more milk in volume and milk of a higher grade, so that part of the additional expense is thus counterbalanced. The United States Department of Agriculture has published a pamphlet in which they show that approximately only one-third of the cows in actual use for milk-producing in this country are kept at a profit. The remaining two-thirds either barely earn their food or cause actual loss. It is a very simple matter, and takes but little time, to keep track of the amount of milk produced by each cow, and thus, after a few months, to decide which cows pay and which had better be sold or gotten rid of in some way or other.

The last point in this connection which I wish to emphasize is the fact that many model dairies do not have competent managers. A competent manager ought to be able to keep track of the condition of the cows, also of the men; ought to be able to induce them to employ their time usefully when the cows do not require their immediate attention, and ought to be able to trace any abnormal condition of the milk to its proper source. I might quote examples where I have seen such dairies in very poor condition from no other reason than the absence of proper supervision.

The key to the whole situation, in my estimation, is the lack of interest on the part of the public. We are all familiar with signs in stores offering eggs, fresh eggs and strictly fresh eggs for sale, but would consider it highly ludicrous if we saw the principle applied to milk. And still the decomposition of eggs is always of the same nature. It is putrefaction caused by the presence of putrefying bacteria. This principle can apply to milk only if it has been either pasteurized or boiled. Milk which has not been treated in this way will not putrefy readily, but usually turns sour, which fact is due to the presence of the so-called lactic acid bacteria. The products of these bacteria are entirely harmless, so much so that in many countries sour milk is eaten as a pleasant and palatable dish. It would, therefore, be more reasonable to sell different qualities of milk than it is to sell different qualities of eggs. The reason why this is not done is simply that the public are not informed on the subject. I do not mean to advise a permanent arrangement of this nature, but think for a transient period it would help largely to educate the public and make them realize that milk and milk may be two very different things.

The lack of interest by the public is shown very clearly by the condition in Boston, a city of 600,000 population, where milk inspection is invited by the authorities, and where the average number of samples presented for examination daily is less than one. After we have succeeded in educating the people, they will be more willing to pay a slight advance for milk, and with an increased demand there will be an increased production and a corresponding reduction in price.

And at this time matters can be hastened by appropriate legislation. I should advise that legislation be not too stringent in the beginning, since it is impossible to obtain an ideal condition by a short step from present conditions. If legislation is too stringent the temptation to those examining milk would tend toward finding more favorable results than actually exist. And it is well known that laws made for a minority usually remain a dead letter. After a moderate standard has been established, and a stringent supervision of the milk supply has been carried on for some length of time, the standard may be amended and gradually brought to the desired point. The consequence of such legislation would naturally be that many dairies would have to go out of business, partly on account of inability, and partly on account of unwillingness, to comply with the regulations.

This would necessitate a betterment in transportation. I see no reason why milk could not be carried to large cities for a distance of hundreds of miles if the railroads would give us the proper facilities for doing so. Some railroads have built cars especially for the milk business, which have refrigerator walls, refrigerator doors—only four doors—and built on such a plan as to avoid the constant passing to and fro of the train employees. These conditions cause the temperature to remain more uniform. In summer the heat and dust will not enter readily, and in winter the milk will not be so liable to freeze. The majority of the cars used today have thin walls, more doors than are necessary, the train officials are in the habit of passing freely through the car, in some an office is found which is heated during the winter, and in consequence is considerable fluctuation in temperature and more or less admission of dust and dirt. With the abolishment of these cars and the introduction of a modern refrigerator car, milk would not suffer if it remained on the train for twenty-four, thirty-six, or even forty-eight hours. In addition to this, the plan of the roads should be to run milk trains on passenger schedule, so as to carry the milk to the city with the utmost possible speed.

We have now followed the milk from the producer to the city, and there are a few words which I wish to mention in connection with the treatment of the milk at home. The sale of milk in bottles is rapidly taking the place of the sale from open cans, the advantage of which has been discussed frequently and need not be repeated here. I have some criticism of the modern milk bottle, however. I see no reason why the neck of the bottle should not be smaller than it is in the accepted form. The only advantage wide-mouthed bottles have is that they are cleaned somewhat more readily. But narrow-necked bottles can be cleaned just as successfully with proper appliances if made according to a suitable pattern. We can then do away with the shoulder which is inside of the neck of the modern milk bottle and have a cap which covers the whole top and overlaps on the outside. The modern way of pressing the pulp cap down on the foam of the milk allows a few drops of milk to remain on top of the cap. Dust and dirt necessarily accumulate in these few drops, and, when the cap is tilted by opening in the house, these few drops, teeming with bacteria, enter the milk and hasten the destruction of its valuable compounds. In some model dairies this excess of milk on the pulp cap is carefully wiped off. During transportation, however, especially if the milk is subject to change in temperature by means of which it expands, and also if the pulp caps do not fit accurately, some milk will squeeze out and remain on the top, and we have the same conditions as previously mentioned. These troubles can entirely be obviated by the use of the narrow-necked bottles and caps closing outside of the neck. Another improvement which I think can be inaugurated with great advantage is the use of bottles with rounded bottoms.

The condition of the herds is a point which requires a great deal of attention and a great deal of intelligent handling by a competent manager. We have learned by experience that the mixed milk of a large herd is more fit for human consumption than milk produced by a single cow. The reason for this is quite obvious. The composition of the milk in all mammals varies from day to day, changing in composition as the young become older. This is perfectly proper where the mammals bring up their own young. But if we take the milk of another mammal to bring up our children, we have to change this condition, and this is attained by mixing the milk of cows which are in all the different periods of lactation. Actual experience has shown that in large herds the average composition of milk from day to day varies but little. Mixed milk from a large herd also adjusts the condition of the fat emulsion in milk from different breeds of cows. The Jersey cow furnishes a fat consisting of large globules. The Holstein and Shorthorns, and others, furnish a milk not so rich in fat, but with smaller globules, and consequently more readily digested. The plan of a good manager, therefore, should be to have a herd consisting not of the purest breeds, but of crosses of pure breeds and of good stock.

The routine examination of milk, such as should be carried out by city boards of health, consists of physical, chemical and bacteriological tests. The ordinary tests for fat, total solids, solids not fat and specific gravity are valuable, but affect principally the pocketbook. The healthfulness of the milk is not revealed by these tests. The bacteriological test, on the other hand, reveals not only the healthfulness of the milk, but also to some extent the conditions under which milk has been produced, the conditions of handling, transportation and the final delivery to the home.

It has been the practice of many boards of health to count the leukocytes in milk, and if this count was high to condemn the milk as containing pus. The value of this test has been questioned of late years, since it was found that leukocytes are always present in milk, and the reason for their appearance is not known. It is a difficult matter to decide at what point the normal condition of leukocytes stops and the abnormal condition presents itself. It is also difficult to decide the difference between the leukocyte and the pus cell. These points have been decided on rather arbitrary principles, and the tendency today is to be more lenient, since it has been found that milks have often been condemned without justice on account of the so-called high leukocyte count.

Similar conditions apply to the determination of streptococci in milk. It has been shown of late years, and evidence is accumulating constantly, that the principal cause of the natural souring of milk is a saprophytic streptococcus which enters milk during the process of milking and is probably largely of intestinal origin. It has been shown that these same organisms are found widely distributed in nature, especially on fields, prairies and all such places where cattle are allowed to stray; in woods, on the contrary, where cattle are scarcely found, the same streptococci have been found but rarely. And when they were found it was shown by their action in culture media that they were in rather an attenuated form. The dust in barns contains them in large numbers and it is consequently practically impossible to prevent milk from containing a few of them. By proper means I have had no difficulty in finding streptococci in all but one of several hundred samples of milk examined in this city. They are very scarce in fresh milk, very scarce in the udder, and, consequently, have frequently been overlooked by scientists. But since they multiply with such enormous rapidity in milk, and are apt to crowd all other bacteria out, we have no difficulty in finding them after the milk has stood for some time. These streptococci, then, are responsible for the souring of milk. And, since they are found in all samples of milk, it is unjust to condemn milk on the strength of finding them. In abnormal conditions of the udder in certain cases of inflammation they are apt to be in milk in enormous numbers. In such cases we are justified in condemning the milk. But here again we meet with the difficulty of deciding between what constitutes a sufficiently large number of streptococci to condemn the milk. It must also be remembered, in this connection, that these streptococci, although their name means that they form chains, very frequently occur in the diplococcoid form. This form is especially frequent after a sojourn in milk, so that for this reason they may be overlooked and the count turn out to be lower than would be in accordance with the true condition. This question still awaits further research, which should aim at finding reliable means of differentiation between streptococci of various origins. The same thing must be said, therefore, in regard to the streptococcus count as has been said before about the leukocyte count, and that is to be careful in condemning milk on account of the presence of streptococci.

In conclusion, I wish to give you a short description of a picture I have in mind of the dairy of the future. The dairy of the future will consist of herds of immense numbers. The food material is to be produced by the dairy farm. The barns are in ideal condition, and the treatment of the cows is ideal. The men are well trained in their duties, not only toward the cows, but in regard to the handling of the milk. The whole farm is under the constant supervision of competent superintendents. Veterinaries are at work constantly inspecting the health of the cows, and scientists have daily control of the milk.

Coupled with such a farm there shall be an educational advertising bureau, whose duty it will be to inform the public what milk is, what it should be; that the milk of the cow was intended by nature to feed the calf, not the human being. If we take it away from the cow, then we have to take the consequences and apply all possible means to keep the milk in its natural condition.

We should teach the people by a few simple tests how to get a general idea of the condition of the milk. One of these tests should show the amount of dirt which collects in the bottom of the bottle. The sense of smell will readily tell whether the so-called cowy odor is present, if proper instructions are given. The cowy taste of milk, due to the presence of more or less minute amounts of cow manure, has become second nature to us to such an extent that the certified milk of today, which contains none of this admixture, appears to taste abnormal. This is one of the principal points on which the public should be instructed. This can be done by sending out pamphlets showing the modern cow as compared with the old-fashioned cow—the modern cow looking clean, neat and trim, while the old-fashioned cow has manure and filth hanging from her skin and udders. The public should be invited to visit freely the dairy, where everybody can convince himself that these things are not only on paper, but are actually carried out. They should be instructed in the possibility of disease transmission through milk; that milk derived from diseased cows, or if produced through milkers not in perfect health, is liable to harbor the germs of certain diseases which find a fruitful soil for multiplication in milk. They should be given examples of extensive epidemics which have actually resulted from the use of such contaminated milk. They should then be instructed in the care of milk at home, to keep their milk cold, to keep the bottles closed when not in use, to keep the tops of the bottles clean, to shake the milk before opening the bottles, and they should be given a fair insight into the conditions produced in milk if it is kept for too great a length of time.

Instruction should also be given in the advantages and uses of separated milk, which contains all the nutritive elements of milk in a somewhat higher degree than whole milk, except only the butter fat; that dishes can be made more palatable with separated milk than they can with water; that milk is a cheaper food than meat; that, consequently, the free use of both whole and separated milk is a matter of economy.

For the present we might advance these conditions by establishing laboratories in all large cities, in which chemical, physical and bacteriological examinations are regularly carried on, and unmercifully publish not only the results but the names of the producers as matter of information to the public as well as to the producers.

RINGWORM OF THE SCALP.—After cutting the hair short, according to Prof. Unna, the head should be washed every morning with soft soap and water, and then the following ointment applied on linen, the whole being covered with gutta-percha tissue and secured by a skull-cap: Salicylic acid, 10 grains; chrysophanic acid, 25 grains; ichthyol, 30 per cent., and vaselin to 1 ounce. This is repeated for four consecutive days, when the ointment as above is replaced by a 20 per cent. ichthyol ointment. Then, after a further four days, the first ointment is substituted, and this alternation is continued. As a rule, a cure can be effected in from three to six weeks.—*The Hospital.*

Clinical Memorandum.

BELL'S PALSY IN AN INFANT OF THREE MONTHS.*

BY J. C. GITTINGS, M.D.,
Assistant Pediatric Physician, University Hospital, etc., Philadelphia.

The following case is worthy of record on account of the age of the patient:—

M. W., female, three months of age, white. Admitted to the Children's Ward of the University Hospital on December 12, 1907.

The family history is negative. The child is one of twins. The mother's milk being insufficient for both, this one has been fed on cow's milk mixtures and has suffered from indigestion, with loss of weight. Three weeks before admission to the hospital a purulent discharge from the right ear was noted, following an acute coryza. The child does not cry except when hungry and apparently the ear causes no pain. The mother has noted the change in facial expression within the past three days.

Examination on admission: Poorly nourished white infant, weight 6 pounds, 4 ounces (2,835 grams); delayed ossification of the coronal and sagittal sutures; no other deformities of the bones. In repose the face presents no gross abnormality, but on crying the phenomena due to paralysis of the right seventh nerve become apparent—inability to close the right eyelid, drawing of the face to the left, obliteration of the nasolabial fold and distortion of the mouth. The act of sucking is little, if at all, interfered with. The right conjunctival sac is reddened and the sclera slightly injected. The heart and lungs appear to be normal; the abdomen is slightly distended and tympanitic; the liver extends 1 cm. below the costal margin in the right midclavicular line, but presents a smooth outline of normal consistence; a small umbilical hernia is present. The examination of the right ear by Dr. Randall shows an acute otitis media with granulations in the tympanic cavity and a foul-smelling mucopurulent discharge; there is no evidence of necrosis of the rudimentary mastoid or of involvement of the wall of the facial canal.

The cervical glands of the anterior and posterior chains on the right side are enlarged, but there is neither redness, softening nor marked tenderness.

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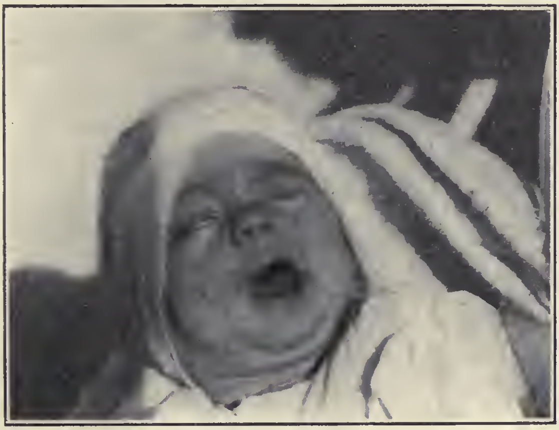
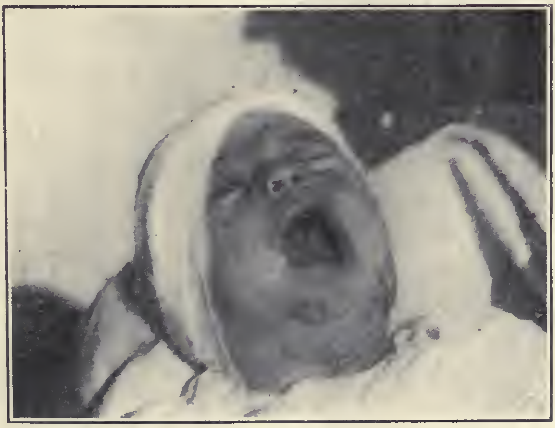
* Read before the Philadelphia Pediatric Society, January 14, 1908.

In view of this fact it is fair to presume that the nerve is involved within the tympanic cavity, rather than by pressure of the glands, for in most of the recorded instances of paralysis



ILLUSTRATING THE DIFFERENCE BETWEEN THE TWO SIDES OF THE FACE. WHEN IN MODERATE ACTION.



ILLUSTRATING THE DIFFERENCE BETWEEN THE TWO SIDES OF THE FACE. WHEN IN STRONG ACTION.

following cervical adenitis the latter is of the suppurating variety.

The course of the case in the hospital was that of a progressive atrophy with slight temperature fluctuations from normal to a maximum of 101° F. until January 4th, when a bronchopneumonia supervened with high irregular temperature, rapid pulse and respirations and persistent, harassing cough. Death occurred on January 10th.

A more careful investigation of the case and the determination of the exact nature of the pneumonia were prevented, partly by the fact that the ward was in quarantine for diphtheria, partly by the miserable condition of the child, and finally by the inability to obtain an autopsy. This is especially to be regretted in view of the fact that facial palsy due to abscess of the middle ear is held by some authorities to be pathognomonic of tuberculosis. The comparatively rapid onset, when pulmonary signs and symptoms had been absent, would point to a terminal septic bronchopneumonia.

In the ARCHIVES OF PEDIATRICS, January, 1906, J. N. W. Rhein reviews the literature in reporting a case of Bell's palsy in an infant of eight months. The youngest case which he found was reported by Henoch, in which the paralysis followed gangrenous destruction of the nerve at the stylomastoid foramen due to noma of the ear in an infant four months old. The youngest case of which I have found any reference was one reported by Dr. Millicent B. Hopkins before the Philadelphia Pediatric Society on October 10th, 1905. In this infant facial paralysis was noted during mastoiditis, for which a radical operation was performed at nine weeks of age.

Apart from the injuries received during parturition the causes of unilateral facial paralysis during infancy may be said to be the same as those which operate during adult life. Probably the most frequent causes are disease of the middle ear and pressure due to suppurating inflammation of the cervical glands at the stylomastoid foramen, in contradistinction to adults, where the so-called "refrigeration palsy" is more often encountered.

The only point of especial interest in connection with involvement of the seventh nerve during infancy is the anatomical arrangement of the bony wall of the Fallopian canal, where the nerve arches over the oval window. At birth, and for some time thereafter, frequently the bone is deficient at this point. On this account "involvement of the nerve from suppurative processes is much more common in children than in adults" (*Piersol's Anatomy*). As Rhein points out, however, the nerve, by reason of this dehiscence in the wall of the canal, is less susceptible to pressure resulting from suppuration and caries. In adults, as has been said, the "refrigeration type" of palsy due to compression of the nerve in the canal by inflammatory exudate is more frequent than that produced by suppurative otitis if we exclude cases of mastoiditis in which radical operation is performed. In these, the facial paralysis forms one of the dangers of the operative procedure.

On the other hand, the occurrence of suppurative otitis media is proportionately more frequent in infancy than in later life. The Eustachian tube is wider, shorter and more horizontal than in the adult, which arrangement, while it may permit freer drainage, yet equally increases the risk of infection from the nasopharynx.

While it would seem, therefore, that exposure of the facial nerve in early life rather invites its suppurative inflammation by direct involvement from otitis media, yet the absence of compression, and possibly the freer drainage by the Eustachian tube, would account for its comparative rarity.

I am indebted to Dr. J. P. Crozer Griffith for permission to report this case.

3942 Chestnut Street.

BACTERIA IN MILK BOTTLES.—The host of bacteria that may lurk in a supposedly clean milk bottle has been the subject of investigation by the Wisconsin Experiment Station. Bottles which had been steamed for 30 seconds were found to contain relatively few bacteria, possibly 15,000 to a bottle. However, when the steam was allowed to condense and the water so produced to remain in the bottle at room temperatures for possibly twenty-four hours, the number of bacteria multiplied enormously and varied from 2,000,000 to, say, 4,000,000. In a series of steamed bottles exposed to the air for twenty-four hours, but containing no condensed water, the number of bacteria averaged 300,000 per bottle; while in a similar series which had undergone the same treatment in all respects except they were covered with a clean linen cloth, averaged about the same as freshly-steamed bottles, all of which shows the very great importance of keeping milk bottles, either empty or full, very carefully covered.—*American Medicine.*

ARCHIVES OF PEDIATRICS.

JUNE, 1908.

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THE SERUM TREATMENT OF CEREBROSPINAL MENINGITIS.

Any mode of treatment that promises to reduce the mortality of cerebrospinal meningitis must arouse immediate and widespread interest. If such treatment can be shown to be positively curative, it must be hailed with delight, since hitherto our therapeutics have consisted, for the most part, in supporting the patient and in mitigating the symptoms rather than in directly attacking the cause of the disease.

What gives promise of being a remarkable advance in managing this distressing disease is the serum treatment inaugurated some months ago by Dr. Flexner, of the Rockefeller Institute for Medical Research. As a result of animal experimentation, a serum was developed which was found to be curative for meningococcus meningitis in monkeys. It was also proved to be harmless. Next it was tried in cases of human cerebrospinal meningitis. Although but a few months have elapsed since the serum was introduced, it has been used with gratifying results by physicians in widely separated localities, namely, San Francisco, Chicago, Akron, O., Washington, Baltimore, New York, Boston, Belfast and Edinburgh. In Akron, O., and in Belfast there have been a sufficient number of cases to constitute epidemics, while elsewhere the serum has been used in the sporadic cases.

At the recent annual meeting of the American Pediatric Society one of the main topics for discussion was the treatment of cerebrospinal meningitis, and Dr. Flexner gave a résumé of the results obtained in about 300 cases of the disease in which the serum has been used. Briefly, the report showed the following:—

In the first place, the serum has never been followed by any injurious consequences. In the second place, there has been a decided reduction in the mortality of the disease. Taking all the cases together without selection, the mortality of the cases treated by serum was under 30 per cent. This is in marked contrast to the general mortality of the cases treated by the usual methods; for in the New York epidemic of 1904 there were 2,350 cases, with a mortality of 75 per cent. Of infants under one year practically every one died. In Belfast, during the present epidemic, the general mortality outside the hospital has been from 75 to 80 per cent. In the hospital where the new serum treatment has been used, the mortality has been 26 per cent. In Akron, O., there were 9 cases treated without serum with 1 recovery, and 12 cases treated with serum with 9 recoveries. Of 14 infants under one year treated by the serum, 9 recovered.

More striking, perhaps, than the reduction in mortality, at least for any individual observer, is the amelioration of the symptoms following the use of the serum. The temperature curve has been markedly influenced. Either there has been a rapid drop or crisis in the temperature within forty-eight hours, or there has been a lysis of the fever in seven or eight days. Along with the subsidence of the fever there has been an improvement in all of the other symptoms—a cessation of the pain and hyperesthesia, a clearing of the mental state, resumption of interest in surroundings, and ability to take food. The opisthotonus and Kernig's sign were the last of the symptoms to be influenced, often persisting for days after the patient was otherwise apparently well. The whole course of the disease, moreover, has been very much shortened—to a week or ten days in many instances. This is in marked contrast to the length of the disease in former cases of recovery. Of 350 cases that recovered in the New York epidemic of 1904, the disease lasted for five weeks or longer in 175 cases.

Lastly, the effect of the serum can be tested objectively under the microscope; for there are important changes that take place in the cerebrospinal fluid after the use of the serum. After the first injections there is observed a lessening in the number of meningococci in the fluid outside of the cells. After successive injections there is observed a lessening of those in the cells, the organisms become swollen and indistinct, and, moreover, fail to grow in cultures. Finally, they disappear altogether, and the amount of the cerebrospinal fluid becomes rapidly less. This effect on the organism, since it can be definitely followed from day to day, furnishes objective proof of the efficacy of the serum; and this evidence is the more valuable since it can be followed in the laboratory by a disinterested investigator, thus ruling out the personal equation of enthusiasts for the treatment.

The technique of the treatment is very simple. Under stringent aseptic precautions the excess of fluid is drawn off from the cerebrospinal canal by lumbar puncture. Then, without removing the needle, from 20 to 30 c.c. of the warmed serum are injected slowly into the spinal canal.* The procedure is to be repeated daily, or every second day, until the temperature falls and the general symptoms have improved. Meantime, the effect upon the cerebrospinal fluid is carefully studied.

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* The serum can be obtained from the Rockefeller Institute for Medical Research, New York City.

As to the mode of action of the serum, Dr. Flexner stated that while the serum is mildly antitoxic, its most important action is bacteriolytic, the serum having the effect of preventing the development of the meningococci and bringing about their disintegration. On account of this property of the serum, it must necessarily be brought into contact with the germs in a fair degree of concentration, and therefore it must be injected into the cerebrospinal canal after the cerebrospinal fluid has been withdrawn. It has little or no effect when injected elsewhere.

The discussion of the topic by several men who have had long experience in the treatment of epidemic cerebrospinal meningitis by other methods and the comparison of former results with those obtained by the serum were very favorable for the serum treatment. The consensus of opinion of the members of the American Pediatric Society seemed to be as follows:—

In every case of cerebrospinal meningitis lumbar puncture should be done as early as possible. If the fluid obtained is turbid, from 20 to 30 c.c. of the antimeningitis serum, warmed to body temperature, should at once be injected into the spinal cord, without waiting for the bacteriological examination of the spinal fluid withdrawn. Turbid or purulent fluid will generally show meningococci. If it should show pyogenic organisms or pneumococci no harm will have been done. If the fluid drawn is clear, it should be carefully examined for meningococci; for, although clear fluid generally shows only tubercle bacilli, meningococci are found in clear fluid both in the very early and in late stages of epidemic cerebrospinal meningitis. The injection should be repeated every day or two until the symptoms are relieved.

It is significant that the more recent reports of the use of the serum show better results than earlier reports. This would seem to mean that the knowledge concerning the time, dosage and frequency of administration of the serum is increasing. It will probably prove true, as with diphtheria antitoxin, that the earlier the serum is administered—that is, before marked inflammatory conditions have occurred—the greater will be its efficiency.

Society Reports.

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, January 21, 1908.

DR. J. W. VANDERSLICE, PRESIDENT.

DR. JOHN L. PORTER reported a case of

CONGENITAL ABSENCE OF RIBS.

The patient, a little girl of four and a half years, had had a lateral curvature of the spine and an asymmetry of the thorax from birth, both of which grew rapidly worse during the first three or three and a half years. During the last six months there had been little change. The skiagraph showed on the right side twelve ribs apparently fully developed; on the left side, however, there were not only four ribs missing, but there was also an absence of vertebræ. Of the eight ribs on the left side, some of them were rudimentary, and two large gaps occurred, from each of which two ribs were missing. The most interesting feature of the skiagraph was the very marked absence of vertebræ. In one place three ribs were trying to articulate with the half of one vertebra on the other side.

The most interesting phase of the case to the doctor, and that uppermost in the minds of the parents, of course, was the treatment. There was nothing in the way of precedence because of the rarity of the condition.

Dr. Porter said it was apparent his patient, as she grew older, would necessarily become very much more deformed, unless something could be done to prevent this increase of abnormal development. He considered it an extremely difficult problem to solve mechanically, since there was no harder problem in the mechanics of the body than to straighten a crooked thorax even when the ribs were present, and was inclined to think the only way to improve the condition was to encase the thorax in a jacket of some non-elastic substance like plaster of Paris and continue that treatment until the child should have reached maturity or, at least, until she was safe from much increase of the defect.

But after putting on five or six plaster of Paris jackets in the usual way, with as much pressure as the child could stand, she did not seem to do so well physically, because of the constant confinement in the jacket, and it was abandoned. However, on a suggestion from the practice of some of the German surgeons in lateral curvature of the spine with a marked caving in, Dr. Porter expected to put on a plaster jacket from the pelvic girdle up, making it very firm where required, and cutting out the cast on the concave side of the curvature so as to give ample breathing space and room for development.

DR. THOMAS GRANT ALLEN read a paper on

CRITERIA AND STANDARDS IN INFANT FEEDING.

Dr. Allen showed that although a food might be right in its percentage composition and of the right quality, it might disagree because of the quantity which was given. So, in order to obtain a food which should be a comfortable and suitable food for the baby one should conform to a standard, or standards, which meets the criteria of nourishment and growth. The three standards by which we are enabled to do this, in Dr. Allen's opinion, are the protein quotient, the energy quotient and the nutritive ratio.

SANITARY MILK.

DR. P. G. HEINEMANN read this paper. (See page 436.)

DR. J. M. DODSON, in discussing Dr. Heinemann's paper, thought one of the great difficulties in educating the people to pay a higher price for milk was the fact that under present conditions they could not be assured that when they did pay 12 or 14 cents a quart they would get what they paid for. Therefore, the first step was not education of the public toward a high price for general consumption, but to devise means of securing milk of the highest possible degree of purity for the special and necessary purpose of feeding infants, and particularly sick infants.

To this end there must be established some method of inspection which will assure the purchaser that he was getting what he paid for—certified milk. This would necessitate the establishment of a bureau of inspection. And such inspection must be under the auspices and control of some disinterested, competent body of men—such a body, for example, as this Society.

Dr. A. C. Cotton thought every member of the Chicago Pediatric Society would agree with every word Dr. Dodson uttered in regard to safeguarding the purity of milk. It made no difference how much care might be used in determining the percentage of the constituents, if it was not good, wholesome milk to begin with, failure would result all along the line. He believed if there were some milk that could be certified by an authoritative commission as being absolutely as pure as milk can be produced, it would sell for any reasonable price which might be asked. He thought this Society could bring about such results if all the members would unite in it.

Dr. Cotton believed that the name, pasteurized milk, was a delusion and a snare, and the remarkably able exposition of Dr. Heinemann showed some of the reasons why it was a delusion and a snare to take refuge behind sterilization or pasteurization.

Dr. J. F. Biehn demonstrated the truth of his statement, that "certified milk" in Chicago could mean anything, by many incidents coming under his observation in connection with the health department of the city. While in a way advocating pasteurized milk, he was convinced that "pasteurization also covers a multitude of sins." He said the statements of milkmen were not sufficient evidence of the quality of milk or the condition and locality of its production. The health department was attempting, however, to work along the lines of clean milk with ten inspectors. Half a dozen pediatrists could accomplish more toward the needed reform than the entire health department of Chicago.

Dr. F. S. Churchill thought Dr. Heineman's suggestion in regard to educating the public on the question of pure milk and its cost was the key to the whole situation—the public must learn that they will have to pay more for a pure milk. He agrees with Dr. Dodson that they are willing to do this if they can be assured they are getting what they pay for. Especially will they pay the higher price for baby's milk, though it may necessitate sacrifices on their own part.

Dr. T. G. Allen told how the physicians of Louisville banded together and demanded milk of a certain standard, appointed inspectors, and by persistence secured pure milk. The bacteriological purity of the milk furnished, with the name of the milkman, was published. He thought Chicago physicians could successfully combat existing evils by similar action.

Dr. William J. Butler pointed out how impracticable would be the attempt to educate a man making $1.50 a day, with half a dozen children, to see the advantages of milk at even 10 cents a quart. That class composed a good share of the population, and they were not able to pay 8 cents even. He said it was the function of physicians to educate every family they come in contact with, professionally, to the advantages of good milk. But he conceived it to be the function of the state or the city to protect the people in the matter of food.

Dr. J. C. Cook said it was the function of the health department to protect those people who were forced by financial conditions to buy cheap milk. And if that department was not efficient in doing so, it should be the purpose of the pediatrists to bring about conditions which will make it efficient.

Impure Heart Sounds in Children.—Neumann (*Münch. Med. Woch.,* Vol. LIV., No. 8) reports several typical cases in which the children were apparently healthy, with nothing to call attention to the heart except the discovery of a lack of purity in the heart sounds. He noticed this in his private practice in 71 children under five years; in 89 between six and ten, and in 20 older children. This change in the character of the heart sounds came on suddenly, and he is inclined to think that it is permanent. Preceding catarrhal affections of the upper air passages are almost invariably mentioned in the history, and he thinks that involvement of the heart in infections of the upper air passages, especially of the nose, is so common that the heart should be supervised in all such cases. Children with this anomaly in the heart sounds evidently have something more or less wrong with the heart. Although slight cyanosis and shortness of breath are sometimes observed, as a rule there are no signs indicating disturbance beyond the one mentioned, and the children take cold baths and exercise violently—against the physician's advice—with apparent immunity. It is evident, however, he thinks, that the heart is not intact, and that the life expectancy is more or less modified by it.—*Journal of American Medical Association.*

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, February 11, 1908.

J. P. Crozer Griffith, M.D., President.

SYMPOSIUM ON RHEUMATISM IN CHILDREN.

THE ETIOLOGY OF RHEUMATIC FEVER.

Dr. Warfield T. Longcope read this paper. He said that, since 1887, various observers had called attention to the association of diplococci with the lesions of rheumatic fever, and during the last few years several writers, particularly in England, had described diplococci which they had recovered at autopsy from the heart's blood, endocardial vegetations, pleural and pericardial exudates and synovial membranes of the joints in cases of rheumatic fever. Diplococci or streptococci had occasionally been isolated from the circulating blood during the course of a severe rheumatic fever complicated by endocarditis or pericarditis, but in uncomplicated cases of rheumatic fever almost all observers had failed to obtain bacteria either from the blood-stream or the free fluid in the joints.

These diplococci or streptococci could not, by any means now at hand, be differentiated morphologically or culturally from streptococcus pyogenes, but certain investigators had claimed that cultures inoculated into rabbits intravenously would produce specific lesions. The lesions which most frequently follow inoculation are multiple arthritis, endocarditis, pericarditis and pleurisy. Recently the question had been raised as to whether these results of inoculation were specific for the streptococci isolated from cases of rheumatic fever. Cole showed, through a series of experiments, that streptococci from various sources might, with fair regularity, produce multiple arthritis, and occasionally endocarditis, in rabbits. Although these results had been disputed by Beattie, it must still be conceded that different strains of streptococci might produce the same lesions in rabbits as streptococci isolated from cases of rheumatic fever, though the latter organisms seemed to give rise to polyarthritis and endocarditis with greater regularity than any other strains so far tested. At the present time there seemed to be no convincing proof that these diplococci are specific bacteria or the cause of a specific disease—rheumatic fever.

THE RELATIONSHIP OF RHEUMATISM TO CHOREA.

Dr. D. J. McCarthy stated that a study of this relationship resolved itself into an investigation of the statistics of clinical and pathological reports covering the last sixty years. As the majority of these reports were controversial in nature, they lacked scientific value. There is, however, a certain unanimity of opinion among those who had investigated the subject in a careful and scientific manner. In the statistics of Osler, Thayer, Wollenberg, etc., a history of antecedent and coincident rheumatism occurred in from 21 to 25 per cent. of cases. Other statistics varied from 4 to 80 per cent. According to the statistics of the three authors above quoted, 75 per cent. of cases were left unaccounted for. The investigations of Dunn, Weil and Thevenot, and Hawthorne showed that rheumatism in childhood need not necessarily be associated with joint symptoms, and might occur without pain. If rheumatic fever might have for its only clinical manifestation an infection of a serous membrane, it was quite possible that a choreic syndrome might likewise be its only manifestation. In the absence of a distinct microorganism as the specific causative agent in all cases of rheumatic fever, the only position that we could be justified in taking in this matter was assuming Sydenham's chorea to be the result of an acute infection; that acute rheumatic fever was by far the most frequent cause, and that until the organism of rheumatic fever had been isolated and accepted other infections must be considered as possible causes. The investigation of Poynton and Holmes, who found the diplococcus rheumaticus in 6 fatal cases, must be accepted as strong evidence that, in the group of fatal cases of chorea, this organism was frequently the cause of the condition.

Dr. McCarthy concluded that: (1) Sydenham's chorea might be considered the result of an acute infectious-toxic process of the cerebral nervous system; that (2) until acute articular rheumatism was distinctly limited as an acute specific infection with a distinct and definite bacterial cause, it was not only not scientific, but it was useless to consider every case of chorea and every apparent case of endocarditis, pericarditis or myocarditis as rheumatic; that (3) on account of the frequency of disease of the serous membranes, and more particularly of the endocardium or myocardium, even mild cases of chorea should be considered as a serious disease of childhood, and that the patient should be confined to bed until the symptoms have subsided for a period of four to six weeks, at least, and in every case the heart should be frequently examined and, during the disease and during convalescence, protected from overaction due to excitement, over-exercise, etc.; and (4) that during the winter and spring months nervous, high-strung children should be carefully guarded as to general hygiene and nutrition, and relieved as far as possible from the worry and overwork associated with school tests and examinations.

THE PECULIARITIES OF THE SYMPTOMATOLOGY OF RHEUMATISM IN CHILDREN.

DR. CHARLES H. DUNN, of Boston, read this paper. He said that the peculiarities of the symptomatology of rheumatism in children were important, not only from their own intrinsic interest, but also from the light which they threw upon the unsettled question of etiology. There was no disease in which the clinical pictures were more widely different in childhood and adult life. The onset of the disease was with cardiac symptoms almost as often as with arthritic symptoms. The onset might be with sore throat, or without any localizing symptoms. The fever was higher and more prolonged in the cases with cardiac symptoms than in those with arthritic symptoms. In general the fever curve was characterized by an absence of any wide daily variation in the temperature and by the absence of abrupt exacerbations and remissions. Constitutional symptoms were slight or absent. The joint symptoms in children were frequently entirely absent. They were characterized by comparative mildness, short duration and fewer joints affected. Nearly all cases in children had evidence of an organic lesion of the heart. In children acute endocarditis was not of insidious development, but was accompanied by actual symptoms of cardiac weakness, which might be the only symptoms of the disease. Another very marked peculiarity of rheumatism in children was the tendency to frequent recurrence, with varying manifestations.

For convenience rheumatism in children might be divided into the following clinical types. (1) The mild arthritic type; (2) the severe arthritic or adult type; (3) the latent type; (4) mild primary endocarditis; (5) severe primary endocarditis; (6) mild pericarditis, and (7) severe pericarditis.

THE COMPLICATIONS OF RHEUMATISM IN CHILDHOOD.

Dr. Alfred Stengel read this paper. He said that the infectious nature of rheumatism was everywhere recognized, though the unity of bacterial causation may be doubted; but it had not been generally emphasized that the symptoms of general infection were frequently strikingly severe in children. If we compared the severe joint disease and relatively mild symptoms of general infection of adults with the cases referred to as occurring in childhood, we would be impressed with the fundamentally important fact that rheumatism was truly an infection with but a moderately preferential localization in the articulations.

The anemia of rheumatism was characterized by marked reduction in the percentage of hemoglobin and in somewhat less decided diminution in the number of red corpuscles. There was usually slight or moderate leukocytosis.

Of the cardiac complications myocarditis was doubtless the most frequent complication, endocarditis and pericarditis being distinctly less common. Of the latter two endocarditis appeared to be the more frequent and perhaps was actually so, although it should be remembered that the after-results of endocarditis were more obvious, and that consequently the frequency of this complication possibly seemed proportionately greater. So far as myocarditis was concerned, it might be accepted as probable that practically all cases of rheumatism in childhood except the most trivial were accompanied by some myocardial disease. In many of the milder cases complete resolution occurred; in others recovery may seem to be complete, though enough residual sclerosis remained behind to form the basis of renewed myocardial disease in later life; in the severest cases the myocardial disease remained as a persistent and obvious condition.

So far as endocarditis and pericarditis were concerned, it was noteworthy that these were far more commonly associated than in the rheumatism of adults and were also more commonly attended with marked grades of myocarditis to make up a veritable pancarditis than is the case in later life.

There are many instances in which pericarditis particularly existed, with but little to indicate that it had developed or that it had associated itself with endocarditis or myocarditis. It was almost generally advisable to assume the existence of pericarditis when marked cardiac lesions were suggested, even though physical signs of pericarditis were not discoverable.

Symptoms of "cerebral rheumatism" were distinctly less common in childhood than in adults.

Pleurisy was a less common complication of the rheumatism of children than of adults.

Sore throat and especially marked tonsillar and other lymphadenoid lesions of the pharynx were distinctly frequent in the rheumatism of children. Enlargements of the regional lymphatic glands were also more common.

Gastrointestinal symptoms were usually entirely secondary and adventitious complications of rheumatism. Gastroenteritis was, however, more frequent in childhood than later.

Few cases of intense cardiac complication of rheumatism escape a more or less decided grade of infectious nephritis.

THE CUTANEOUS MANIFESTATIONS OBSERVED IN RHEUMATISM IN CHILDREN.

Dr. Jay F. Schamberg stated that the eruptions most frequently noted in rheumatism were erythema multiforme, usually of the gyrate or papular form; erythema nodosum, scarlatiniform erythema, urticaria and forms of purpura. These eruptive manifestations all belonged to the so-called "erythema group of skin diseases."

Dr. Schamberg referred to simple herpes, sudaminous vesicles, miliaria, the various erythemata, urticaria and purpura hemorrhagica as the eruptions encountered at times in rheumatic fever. He expressed the opinion that erythema nodosum and peliosis rheumatica were not pure and essential rheumatic processes, but that they were toxic affections produced by a variety of infections, of which the rheumatic was the most frequent.

THE TREATMENT OF RHEUMATISM IN CHILDREN.

Dr. J. P. Crozer Griffith said that owing to the great tendency to recurrence of the disease, prophylaxis was the chief desideratum. This was especially true in rheumatically disposed children. Overheating, exposure and overfatigue should be guarded against. Underclothes should be warm, but not warm enough to produce perspiration on the slightest exercise. A child who grew warm from violent exercise out of doors should not be allowed afterward to stand about unprotected. Change of climate was of great value for those disposed to rheumatism, especially in the spring and winter. Warm, dry, equable climates were to be preferred. High altitudes, although dry, were objectionable. Tonsillitis should be treated promptly, as the germs of rheumatism often entered in this way.

In the treatment of the attack, external treatment was first considered. Absolute rest was imperative, especially in view of the difficulty of recognizing the beginning of cardiac involvement. Inflamed joints should be wrapped in cotton and often immobilized. Warm water should replace cold for ablution. Of applications recommended, ichthyol and oil of gaultheria had many supporters and were often serviceable. Gentle compression of the joints was sometimes useful. The Bier method was worthy of trial. Blistering over the heart, if this organ becomes involved, was of questionable benefit and not applicable to young children.

For internal treatment of the many drugs recommended, those still especially in vogue were salicylic acid and the alkalies. Although there was no proof that the salicylates certainly cure the disease, yet they undoubtedly relieved the pain and we had as yet nothing to be preferred to them. Salipyrin, salophen and aspirin were often useful, but generally could not replace the ordinary salicylates. Salicylic acid preparations did not seem to have any influence in preventing cardiac involvement. Alkalies in large amounts should be administered when the urine was decidedly acid. Evidence had been advanced to the effect that they prevented the development of cardiac complications. A specific serum treatment had been tried by several observers, but the results were not convincing.

Chronic rheumatism was particularly resistant to treatment, and was usually not benefited by the salicylates or alkalies. Hydrotherapeutic measures, particularly sojourns at hot springs, were useful in this form. Cod-liver oil, arsenic and iodid of iron internally were often of benefit. Dry heat was frequently serviceable.

The relationship of muscular rheumatism to other forms of rheumatism was uncertain. It was frequently seen in individuals who were disposed to rheumatic arthritis. The treatment indicated for the latter condition was of service in the former and, in addition, such measures as counterirritation, heat, electricity and massage might be valuable.

Dr. Edwin E. Graham, in opening the discussion, said the point to be emphasized was, that while rheumatic fever is a common disease in childhood, it is not so common under the age of three years; and that associated with rheumatic fever we do not necessarily have an arthritis. Therefore, in beginning a consideration of rheumatic fever in children, one must approach the subject in a very different way from what one would in an adult. Many family histories of children will show a distinct tendency to rheumatism in one or both parents, or in one or more of the grandparents. In arriving at a diagnosis, one should take into consideration the fact that the symptomatology of rheumatism in the child is distributed over a very long period, and there is not likely to be a sharp, clear-cut attack, as in the adult. The child has the rheumatic diathesis, however, and the symptoms persist more or less during child life. Therefore, symptoms such as sore throat, tonsillitis, erythema, vague joint pains, growing pains and muscular pains and soreness should be considered, because while they, perhaps, would not point to distinct rheumatic fever in adults, they certainly do so in children. Where there is a moderate amount of pain associated with a moderate amount of fever, and perhaps sore throat, one is justified in making a diagnosis of rheumatic fever in the child.

The picture of rheumatism in America does not correspond with the English picture of that disease. In regard to the observations of Still concerning subcutaneous nodules, referred to by Dr. Stengel, Dr. Graham thought that if those were carefully looked for they might be discovered more frequently than they are. He has been looking for them for a number of years, and has occasionally found them. They are not tender and are not visible unless the skin is drawn tense. Dr. Graham thought it unfair to assume that every case of fever with joint pains was rheumatic; but if we exclude syphilitic and tubercular bone disease, osteomyelitis, scurvy, etc., the large majority of cases can be proved to be rheumatic in exactly the way described by Dr. Dunn by following the child's history through the period of childhood. The attacks usually recur; and if no heart lesion is discovered in the first attack, it will probably appear in the second or some subsequent recurrence.

In regard to the prognosis, the danger from heart lesions is, in the majority of cases, one of the future; yet he had seen a case of rheumatism in a child four and a half years old that ended fatally in one month. This child had never been sick enough to be in bed until thirty days before death. The arthritic symptoms of rheumatism in children may be very mild, or entirely absent, the force of the rheumatic poison not uncommonly expending itself on the heart, associated with which the kidney is likely to be affected. The child just referred to had albuminuria and casts, but the arthritis was not sufficient to cause it to be put to bed earlier than the time mentioned, when it was seen by Dr. Graham. The mother told him that the most it had complained of was a moderate amount of pain when stooping down in play. Cases of this kind are not, however, very common.

The initial symptoms of rheumatism will be found to point more commonly to the throat than has hitherto been suspected: usually they are not severe enough to make the child complain of pain or difficulty in swallowing, but a careful examination of cases in which one suspects rheumatic fever will, in a fair proportion of cases, show that the child had distinct throat symptoms, redness and perhaps tonsillitis.

Dr. David L. Edsall said that he was glad to hear Dr. McCarthy state so firmly and definitely that chorea belongs among the infectious conditions. A year ago, he had heard a distinguished neurologist poke fun at clinicians because they would insist upon calling it an infectious disease. He thought it especially important that this disease should be recognized as being subject to the same complications that an infectious disease is subject to. It is desirable from the beginning that the chorea patient should be put in circumstances to make it as unlikely as possible to bring on complications, more particularly endocarditis, or to make it worse should it appear.

In regard to Dr. Dunn's very admirable and lucid paper, just read, and from one published by him a year ago, Dr. Edsall said that they brought out, in a way that has scarcely been done so forcibly before, two important points, viz.: the great frequency of the cardiac lesions without noteworthy arthritis in rheumatism in childhood and the way in which rheumatism often comes on with cardiac symptoms, as contrasted with the usual later development of actual symptoms in adults; and, on the other hand, the very great frequency with which obscure symptoms occur in childhood, pointing only slightly to the articulations. These points, particularly in dealing with students, must be insisted upon very firmly, as students do not grasp them until they are forcefully demonstrated.

Dr. Edsall partly differed with Dr. Dunn in his general conception of the condition. He thought that, while it is all very well as a working basis to group these endocardial conditions of obscure causation and the joint conditions of obscure causation under the name of rheumatism, one ought to bear in mind constantly the fact that has been coming out more clearly in relation to joint conditions in adults, that some local cause for these conditions must be looked for constantly. As time goes on, although a large proportion of cases remain obscure and appear to constitute a distinct disease, a certain considerable number are falling into the class of those that are considered sepses due to some focal source of infection in the throat, the gastrointestinal tract, the genitourinary tract and various other situations. If all obscure conditions are simply grouped as rheumatism, progress will be obstructed, unless it be realized that one must not stop with the provisional diagnosis of rheumatism, but must keep in mind that focal sources of infection must be sought for, and if present, got rid of.

Many persons will say that these are even less commonly found in children than in adults. In recent years, however, the tendency has been to include almost everything that is obscure among acute conditions of this kind under rheumatism in childhood, while the tendency in dealing with adults has been to realize that many things that used to be classed as rheumatism are not rheumatism. Classing all indefinite joint and cardiac conditions as rheumatism obscures the fact that focal sources of infection may be found. If such are found, we can sometimes overcome the trouble directly, and hence they must be looked for, whether one calls the case rheumatism or not.

It is desirable to study particularly the obscure cases, especially the prolonged and recurrent cases in childhood, studying them more regularly bacteriologically and taking blood cultures whenever possible. In some instances, in youthful subjects whose cases Dr. Edsall would otherwise have classed as rheumatic, he has found cultures of organisms that, with our present conception, put these cases into a group other than simple rheumatism. In some instances cases have been described in which focal sources of infection were found, and the condition was controlled by getting rid of the focus of infection.

Dr. George B. Wood said that, as he understood the present status of opinion as to the cause of acute rheumatism, the question of specificity is still undetermined. Dr. F. A. Packard, in his memorable work on the relation between tonsillitis and rheumatism, said he believed that acute articular rheumatism is due to the attenuation of organisms by their passage through the tonsillar structure. A third possibility as to the cause of rheumatism is that the condition is not a bacteriemia, but rather a true septicemia, due to the absorption of toxins from the local focus. If it were to be proved that there is a specific germ, theoretically it does not seem likely that the tonsillar structures would be any more responsible for the entrance of these specific microorganisms than other portions of the gastrointestinal tract. The tonsils are lymphatic structures, and, as we know, lymph glands act as filters to prevent the entrance of organisms into the general system. If, however, we believe with Dr. Packard that rheumatism results from the attenuation of various pyogenic germs, then the tonsils must be considered as very important structures in the etiology of this disease. The retention of organisms in the tonsillar crypts, where they come in contact with the vital action of the tonsillar tissue, undoubtedly favors the modification of their virulence. Further, if they are sufficiently pathogenic to penetrate the tonsillar structure proper, they can enter the blood only after they have passed through the tonsil and the cervical chain of lymph nodes. If the symptoms of rheumatism depended simply upon the presence of toxins absorbed from some local infected focus, again the tonsillar structures must undoubtedly be considered as holding important etiological relations to this disease.

Dr. Wood said that in using the term "tonsil" he meant to include not only the faucial, and, perhaps, pharyngeal tonsils, but also the lateral folds of the pharynx, the lingual tonsil and the solitary nodules on the postpharyngeal wall; in fact, all the lymphatic structure of the mucous membrane where the adenoid tissue comes in direct relation with the surface epithelium or its invaginations. This should probably include the solitary follicles of the gastrointestinal tract and the lymphatic tissue of the appendix, but as the faucial tonsils possess certain anatomical structures which favor the retention of microorganisms, they are much more important as etiological factors than any other tonsillar tissue.

Dr. Wood said that the association of tonsillitis with rheumatism has been recognized by almost all observers, but the exact relation of the two is subject to a large variance of opinion. McCrae gives 3.7 per cent. of cases of rheumatism showing tonsillitis, while Hammerschmidt gives 50 per cent., and says that all his cases showed some pharyngeal irritation. Other observers range between these two. Gurich has reported that certain cases of rheumatism show reaction when the tonsil is operated upon, while others do not; and he believes there is a tonsillar type of rheumatism in which the removal of the tonsillar tissue cures the disease. In children it is most essential, as Dr. Dunn has pointed out, that the tonsils and pharynx should be carefully inspected, as conditions are frequently overlooked in children when the physician in charge depends for his diagnosis upon the complaint of the patient. Again, the physician must remember that even direct examination may fail to reveal any tonsillar changes, although they exist. Dr. Wood has frequently opened large retention crypts in tonsils, during operation, which were absolutely unsuspected; has found unsuspected tubercular deposits by microscopic examination; also small abscesses within the tonsil parenchyma where the visible portions of the tonsil were perfectly normal.

It is undoubted that certain cases of rheumatism are cured by removal of the tonsils, while other cases remain absolutely unaffected. It is Dr. Wood's belief that positive evidence as to the importance of the faucial and pharyngeal tonsils in the etiology of rheumatism is to be obtained only by a study of those rheumatic patients from whom the tonsillar structures have been removed.

Dr. Alfred Hand, Jr., said that one or two points had struck him as especially interesting. When Dr. McCarthy spoke of the similarity between rheumatism and chorea, it suggested a point of dissimilarity, which is shown by the condition of the heart. In rheumatism the pulse is always accelerated, and if the pericardium or endocardium is inflamed the heart action is very rapid. In all of the cases of chorea which Dr. Hand has seen in the last few years the pulse is usually slow—60 or 50. From the weakness of the pulse and the general prostration, it seems that inhibition through the nervous mechanism could not solely account for it; there must be some change in the myocardium, perhaps a slight degeneration. The latter is, however, really a point of resemblance between rheumatism and chorea, because the myocardium has always degenerated in rheumatism and the prognosis depends not so much upon the valves infected or the severity of the valvular lesions as upon the degree of myocardial involvement.

Another point of interest lies in the beneficial effect of the treatment with alkalies. English writers advocate large doses of salicylates. Dr. Hand has tried them, but with no better success than with the alkalies. He has abandoned the use of Fowler's solution in chorea, except when other remedies have failed. He first tries the alkalies and the cases usually respond very well.

Dr. Hand remarked that Dr. Dunn had very well brought out a thought that had occurred to him when at Toronto attending the meeting of the British Medical Association, listening to a symposium on rheumatism, viz.: that geographical distribution plays some part in the occurrence of rheumatic nodules. He has been looking for these ever since his student days and has found but one case of subcutaneous rheumatic nodes. The English apparently lay great stress upon them, so there must be some geographical influence at work to cause their production. The same disease will undoubtedly vary in different locations.

In regard to the fact that anemia is usually more marked in children than in adults, as mentioned by Dr. Stengel, Dr. Hand said that he agreed that this is so. Anemia is a guide in the prognosis. If profound, he feels much discouraged. He has seen a number of cases of rheumatic endocarditis that apparently yielded to the alkalies; yet a profound anemia which would not respond to tonics, fresh air, hygiene, etc., came on and progressed. There would then be a relapse of the endocarditis, either with fever or with sudden heart failure, sometimes with symptoms suggesting pulmonary infarct.

In regard to the use of salicylates in acute rheumatism, referred to by the President, Dr. Hand said that his custom is to employ them as a check on the diagnosis. If he makes a diagnosis of rheumatism and the salicylates do not give a prompt response in a few days, either in relieving pain or in controlling fever, he considers that the diagnosis should be carefully revised. The salicylates, if persisted in, will not then be of benefit, even though the case be clearly rheumatism.

Dr. Theodore Le Boutillier said that, while working in Edinburgh in 1900, the question of rheumatic nodules came up, and he saw in two months 6 or 8 cases that showed the nodes very well. He has since been looking for them and has found in this city 7 or 8 cases of clear rheumatic nodules. These have been found almost exclusively in children with recurrent attacks of rheumatism and in those showing grave heart lesions. In this part of the country, therefore, rheumatic nodules are occasionally seen.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, March 12, 1908.

GODFREY R. PISEK, M.D., CHAIRMAN.

DEMONSTRATION OF DR. FOWLER'S SUCTION BELL DOUCHE.

DR. EDMUND PRINCE FOWLER showed his suction bell douche apparatus, which consists of a glass bell with two nipples, one for the inlet and one for the outflow, the former being attached to a fountain syringe, the latter by means of a two-foot rubber tube to any receptacle. To the first nipple is attached a soft rubber nozzle, which projects inward into the meatus. When the apparatus is applied to the ear the circumference of the bell fits snugly around the ear and close to the head. There is, therefore, no leakage with ordinary care; the nozzle entering the meatus but a short way there can be no injury to the drum, and the bell being of glass a clear view is insured at all times and the apparatus may be sterilized by boiling.

In addition to the advantages of safe and effective irrigation, there is suction generated by the siphonage and the small size of the nozzle, which admits less fluid than the outlet is capable of carrying off. This suction is about that of 30 mm. of mercury, is less than often used in treatment by a Politzer bag, and is not painful to the patients.

By this apparatus the ears of rebellious infants can be irrigated with ease, for the child cannot get away from control; the height of the fountain syringe and the amount of suction cannot cause damage; vertigo is not noticed with this apparatus, as it so often is in the course of an ear irrigation. The apparatus has many other advantages, among which is that the drum membrane is drawn away from the promontory by the suction, thus avoiding adhesions.

AMAUROTIC FAMILY IDIOCY.

DR. CHARLES HERRMAN presented a baby, fourteen months old, from Dr. La Fétra's service. The parents were Hebrews. There was no history of nervous or mental disease. The labor was instrumental, the child being cyanotic for some time. The baby was breast-fed for ten months. At two months the mother noticed that the baby could not move its arms or legs properly and did not notice objects. At the age of seven months the baby had convulsions; at thirteen months a very severe convulsion occurred. The child was almost entirely blind, and the characteristic cherry-red spot in the macula region was present. The patient could not hold its head up. The legs were spastic at times. The reflexes were not increased. The baby had a slight umbilical hernia and the testes had not descended. There was an optic atrophy.

Dr. Sara Welt-Kakels presented a boy eighteen months old. The parents, who were healthy and of German extraction, were not related, give no history of tuberculosis or syphilis, and have had five children, two of whom died of amaurotic family idiocy; a third one died, a few weeks old, from blood poisoning after circumcision; and a fourth child is a well-developed boy of six years. The child presented was born at full term and was not asphyxiated at birth. He appeared to be normal to about the fifth month, when the first symptoms appeared; now all the pathognomonic symptoms, pointed out so well by Dr. Sachs, were present. The child had the usual changes in the macula and optic atrophy.

Dr. Welt-Kakels showed pictures of another case, in which there were the characteristic symptoms.

Dr. Martin Cohen presented a specimen of an eye that had been removed two hours after death in a case of amaurotic family idiocy, and which had been preserved in Müller's fluid. It showed the marked atrophy of the optic nerve and dilation of the veins with contraction of the arteries. The bright cherry-red spot could be well seen in the macula.

Dr. Henry Heiman reported 3 cases of amaurotic family idiocy which he had seen last summer. The spinal fluid showed no cellular elements. The pressure of the fluid in the spinal canal was but slightly increased.

CASE OF DEXTROCARDIA.

Dr. Sidney V. Haas presented from Dr. La Fétra's service a seven weeks old baby whose heart was found to be upon the right side. The apex was somewhere in the vicinity of the fifth right intercostal space, well outside the nipple line. None of the other organs appeared to be transposed. When the child cried he became blue. There was a marked systolic murmur heard over the cardiac area.

Dr. Godfrey R. Pisek reported a case of dextrocardia which had existed for eight years before the condition was recognized.

Dr. Ward Bryant Hoag reported the case of a man, twenty-five or thirty years of age, whose heart was found to be upon the right side. There was given no history of any acute illness or effusion in the chest, or anything that would push the heart over to the right side. He had had no dyspnea.

Dr. Herman Schwarz said it was rare for a dextrocardia to occur without a transposition of the other viscera. In these cases an X-ray picture was of great value in determining the condition. The transposition of the heart, viscera and vessels seemed to go together.

CASE OF LYMPHANGIECTASIS.

Dr. Henry Heiman presented a baby eight months of age. The birth of this child was normal. It was breast-fed until one month ago. The family history was negative. The child, at the age of three months, had a retropharyngeal abscess, which was incised, and the wound healed in two weeks. The present illness dated back two weeks, when there appeared a swelling over the left clavicle, which had remained stationary. There was no fever, but the child was restless and very peevish.

This was a case of lymphangiectasis, a tumor consisting of dilated lymphatic vessels. It occurred, as a rule, as a congenital affection. The tumor was caused by some obstruction to the lymphatic circulation. The greatest precaution should be taken in aspirating such a tumor. Total extirpation of the mass may sometimes be necessary for a radical cure. This condition was to be differentiated from a cold abscess, gumma, diffuse lipoma, hernia of the lung, hematoma and an aneurism.

Dr. Montgomery Hunt Sicard presented a case of hydrocephalus.

Dr. Sara Welt-Kakels reported a case of hydrocephalus in which Von Pirquet's test was tried and gave a positive reaction. She thought that, in such cases, this test was worthy of consideration.

TREATMENT OF CLUB-FOOT.

Dr. Reginald H. Sayre said that cases of congenital club-foot, if taken early enough, could be treated successfully without resorting to tenotomy, because in the early months of life the bones and other tissues were more or less pliable and amenable to plaster of Paris applications. But later on something should be applied that was removable. He had found that wire, bent to the required shape, and supported with a metal foot plate, when strapped to the part, kept it in proper position. Adhesive straps placed on the side of the limb, properly buckling the apparatus, would keep the heel in the apparatus. The apparatus should go so far up as to grasp the thigh when applied for club-foot, and the knee should be bent so as to retain the foot in the position of eversion. Cases would relapse if the treatment was stopped before the patient had normal volition and could, in response to normal excitation, place the limb in its proper position. Dr. Sayre presented a case to demonstrate his meaning, as well as the application of the plaster of Paris apparatus.

Dr. Sayre presented another case, a baby, whose feet were in bad shape because of lack of proper care, and another baby whose feet were in proper shape, due to proper care. The latter required only a piece of elastic to aid in keeping the feet everted.

VOLKMANN'S ISCHEMIC PARALYSIS.

Dr. Reginald H. Sayre said that Volkmann's ischemic paralysis was only occasionally reported in the literature, because such reports were very apt to render the reporter liable to suits for malpractice. This condition was always the result of malpractice. In 1875 Volkmann first drew the attention of the profession to this condition, that after too tight bandaging after cases of fracture, such a paralysis would, or might, occur. In 1884 Lesser wrote an elaborate monograph upon this subject, and cited 7 cases occurring in the upper extremities. Lesser's experiments upon animals, tying tight bands about the legs, showed that similar results could be obtained to those obtained in the human. This paralysis had followed the application of Esmarch's bandage when the bandage had been applied for too long a time. Bernays had reported 1 case of postpartum hemorrhage, in which both lower extremities had been bound up from midnight to 9 A.M. Following this characteristic symptoms like rigor mortis, etc., developed, and the patient died of sepsis and exhaustion after three days. If one kept such a constriction on muscles for a period of perhaps seven hours or thereabouts, these muscles would be killed. One might get gangrene or a destruction of muscle.

Dr. Sayre presented a child who had sustained a fracture of the forearm in 1906. At that time the arms was done up in splints, which were worn for several weeks. At the end of the seventh week the fingers were tightly contracted in the palm of the hand and the hand slightly flexed on the forearm. The hand was useless. The case had been treated without benefit, at one of the hospitals, by massage and electricity for months, and had presented herself at his clinic in October, 1907. The method of Jones, which consists of the employment of constant stretching, instead of the intermittent work usually done in these cases, has been followed with very great improvement in the condition.

Dr. Herman Schwarz said he did not believe that pressure alone caused this form of paralysis; that necrosis no doubt did occur. Many of these cases so reported were not instances of Volkmann's ischemic paralysis, but pressure necrosis.

CASE OF SPLENOMEGALY.

Dr. Dennett pesented a case of primary enlargement of the spleen. The child was twelve years old. This boy had been perfectly well, so far as was known, except for an attack of measles at the age of three. Two or three years ago the enlargement of the abdomen was noticed. The total liver dullness was 15 cm. at nipple line, and the spleen came 6 cm. below and 5 cm. to the right of the umbilicus. There were no glandular enlargements. The blood count showed 4,800,000 erythrocytes, 85 per cent. hemoglobin, and 15,000 whites (57 per cent. polymorphonuclears, 40 per cent. small lymphocytes, 2 per cent. large lymphocytes, and 1 per cent. transitionals). In other words, this child had this condition for at least three years and probably longer. There was no anemia. The child had a good color and was bright mentally. He made the diagnosis of primary splenomegaly. Bovaird, in 1900, had reported 2 such cases, and in 1 the blood examination was practically the same as in this case.

CASE OF SCROFULODERMA.

Dr. Charles Herrman presented this case, which showed congenital deformities of the hands and feet, the nose and ears, and the palate was asymmetrical. There was also a peculiar condition of the tonsils. In addition to all this there was this peculiar condition of the skin, which involved the deeper tissues of the skin and left well-defined scars in the skin. The color was the rather characteristic livid red. The lesions were not painful and were circumscribed. It was interesting to note that the child presented such a combination of deformities and this peculiar condition of the skin. He believed the tuberculin test should be made.

CASE OF POLIOMYELITIS.

DR. DENNETT presented a child, four years old, who had a typical attack of anterior poliomyelitis during the middle of last August, with paralysis of all four extremities and the neck. At the same time there was 1 other case in the family, while there were 12 cases in the town. The other child died in ten days. An interesting feature in the case reported was that all four extremities improved markedly. But he found that there was an involvement of the abdominal muscles above the umbilicus, and this had not improved. All that the patient now presented was this paralysis of the upper abdominal muscles.

A NEW JACKET FOR THE CORRECTION OF DEFORMITY IN POTT'S DISEASE.

DR. CHARLTON WALLACE presented this new jacket, showing the open space for breathing. He showed 2 children wearing this new jacket.

PROBABLE TRANSPOSITION OF THE VESSELS OF THE HEART.

DR. HERMAN SCHWARZ presented a boy, nine years old, who had a cough, was cyanotic, and had clubbed fingers. The cyanosis was noticed at birth. Physical examination, even with X-ray, showed heart and lungs normal. Generally one could assume that a cyanosis of this sort, with no exertion in walking, with a clear heart tone, was due to a transposition of the vessels at the base of the heart. This diagnosis was problematical. An open septum might be present without symptoms.

DR. LOUIS FISCHER presented a case of sporadic cretinism, twenty-five years old, who had been under the treatment of Dr. Manson for a number of years. He still showed stunted growth, thickened and broad nose, bald head, dry skin, marked ataxic staggering gait, and exaggerated reflexes, especially the knee-jerk. The height was 52½ inches. The case was presented to illustrate an improvement in the mental condition, which, however, was still subnormal, the patient being unable to support himself. Thyroid extract was being administered—15 grains daily.

A CRETIN. RESULT OF SIX YEARS' TREATMENT.

Dr. Eli Long presented a girl, whom he first saw when she was but eleven months of age. She was then a true cretin, and now, though nine years old, has the mind of an infant. She had been given 15 grains of thyroid daily, and although her physical condition is good, there had been no mental growth.

Dr. Long also presented photographs of this case and of another cretin, a man twenty-three years old, before any administration of thyroid. For the past five years this man has taken thyroid continuously, and while his physical condition is almost perfect, his mind is that of an idiot.

The cases were presented as illustrating in the case of the girl of nine years the absolute failure of thyroid, though begun at the early age of eleven months and continued persistently ever since, to bring about any mental growth whatsoever, or, in this particular case, the possibility of the occurrence of mental deterioration superadded to the original cretin state, notwithstanding the use of thyroid extract; and as illustrating in the case of the man of twenty-three years the fact that after cretinism has been established for this length of time the administration of thyroid, though wonderfully improving the body, does very little for the mind.

AN UNUSUAL CASE OF MASTOIDITIS.

Dr. John McCoy illustrated on the blackboard an unusual case of mastoiditis. The patient, a girl nine years old, was brought to him by Dr. Long. One month previous to coming under observation she had had earache, but no discharge from the ear. No symptoms then until two days before coming under observation, when she complained of pain as she lay on the left ear. On examination, she was seen to have a boggy swelling back of the left ear, which fluctuated. Examination of the drum showed it to be of a dull red color and there was sagging of the superior canal wall. It was felt that the origin of the pus externally was in the mastoid, and she was sent into the New York Eye and Ear Infirmary for operation. Upon incising the fluctuating mass a large amount of pus was evacuated. It was then found that the cortex of the mastoid was perforated, the opening was about one-quarter of an inch in diameter. The opening in the cortex was enlarged and the whole mastoid was found filled with granulation tissue and pus; practically the whole mastoid process was eventrated. The inner plate of the mastoid over the lateral sinus was deficient for about a half inch. The cavity was cleaned and dressed and the girl was now doing nicely.

It was interesting to note the length of time a child could go with such a condition and not give symptoms until the pus found its way externally. This case was a good illustration of the benefit to be derived from an early free incision of the drum membrane.

REMARKS ON THE EARLY DIAGNOSIS OF POTT'S DISEASE.

Dr. Charlton Wallace said that the most important feature in making an early diagnosis of Pott's disease was making it before the development of the kyphos.

In the history, an exposure to pulmonary tuberculosis was of some importance. Occasionally marked deformity would develop in a child without its giving any history of subjective symptoms, but usually a history of pain or night cries was elicited. Loss of weight, weakness, disinclination to play, peculiar carriage of the head and shoulders, leaning to one side or walking on the toes might occur. Often the diagnosis was made by the mother from the prominence in the back when the doctors had not undressed the child to examine it.

In the examination, the child being undressed, close observation should be made to see what effort the child made to protect his movements. His gait and the flexibility of his spine should be noted. Sayre's sign, which tests this latter factor when the child stoops to pick up something from the floor, should be employed. The normal curves of the back, which were usually obliterated when the normal child lay down, were exaggerated in Pott's disease from the rigidity of the muscles, which strove to protect the parts. The most important sign was the limitation of the motions in all directions. This might be elicited by placing the child face downward and grasping both ankles with one hand, raising them and moving them up and down and from side to side while the other hand held the back steady. When the patient was in this position a single projecting spine would be detected frequently.

In the treatment the orthopedist should aim to prevent and to correct deformity. The former was best accomplished by keeping the child upon a frame for several months during the earliest stage of the disease. The Cabot plaster of Paris jacket was the best corrective ambulatory treatment, being much to be preferred to the old-fashioned head-spring and jacket.

Current Literature.

Abstracts in this Number by

Dr. A. W. Bingham. Dr. G. R. Pisek.
Dr. Henry Heiman. Dr. S. W. Thurber.

PATHOLOGY.

Theisen, Clement F.: Sarcoma of the Pharynx in a Child of Eight Years, with Report of Autopsy Findings and Microscope Report. (*Annals of Otology, Rhinology and Laryngology,* June, 1907, p. 349.)

One interesting point in the history is that the child's great-grandfather is said to have died of cancer of the throat. This child had been experiencing difficulty in breathing for several months on account of the growth of a large mass inclosing the soft palate and pushing it forward. The growth extended downward almost to the epiglottis. There was discharge of foul purulent material from the left naris. Neither the use of Coley's serum nor adrenalin by needle did any good, and the child died two months after being first seen. Autopsy and microscope confirmed clinical diagnosis.

The author quotes a similar case reported by Halstead in 1897, in a child aged two years.

Seven other cases in children have been reported up to 1902.

S. W. Thurber.

MEDICINE.

Smith, Eustace: Laryngismus Stridulus in Newborn Infants. (*British Medical Journal,* July 20, 1907, p. 131.)

Laryngismus stridulus, though frequently associated with rickets, may affect healthy young infants in the first month of life. It is essentially a reflex spasm, the common feature in 3 cases being nasal obstruction due to adenoid overgrowth and postnasal catarrh. The spasm involves the vocal cords, sometimes also the muscles of the tongue and of the esophagus. The degree of distress varies widely, from an occasional croak to a severe and prolonged spasm in which breathing completely ceases; the face grows slate-colored and the infant seems at the point of suffocation. Death may be due to suffocation, exhaustion or pulmonary collapse. Spasm of the esophagus increases the difficulty of supplying adequate nourishment. The association with tetany in the newborn babe is exceptional, and with general convulsions not common.

In the mild cases a weak resorcin solution should be instilled into the nostrils several times a day; in severe cases the pharynx must be cleared of adenoids. In spasm of the esophagus the child must be fed by gavage.

In an attack the tongue should be hooked forward by the finger and respiration stimulated by cold water or smelling salts. Artificial respiration and insufflation may be necessary.

A. W. BINGHAM.

OBERWARTH, E.: HUTCHINSONIAN TEETH. A CONTRIBUTION TO THE KNOWLEDGE OF HEREDITARY SYPHILIS. (*Jahrbuch für Kinderhk.*, August 1st, p. 220.)

At Neumann's Children's Clinic at Berlin there were seen during the past sixteen years 27 patients with deformity of the teeth usually described as Hutchinsonian. Of these patients 24 undoubtedly had congenital syphilis, while the remaining 3 probably had the disease. This result is quite at variance with the most recently expressed views of well-known pediatrists in regard to the diagnostic value of Hutchinsonian teeth. The author does not attempt to explain the discrepancy fully. At Neumann's Clinic only those teeth are considered Hutchinsonian in type that possess the following characteristics:—

(1) The deformity of the permanent teeth only.

(2) The involvement not only of the cutting surface of the teeth, but of the entire crown.

(3) The abnormal position of the teeth in the sockets.

The important diagnostic features are the abnormal shape of the crown as a whole, and the irregular setting of the teeth. Eroded and serrated teeth are most often mistaken for Hutchinsonian teeth, and perhaps this fact explains the varying importance that is attached to the sign by medical authors.

HENRY HEIMAN.

DAVIDSON, R. BARING: RECURRING EPISTAXIS IN A GIRL. (*British Medical Journal,* March 9, 1907, p. 562.)

A girl, aged eleven, suffering from a slight attack of influenza, had a severe epistaxis, repeated twice the next day. She gave a history of nose-bleeds every second or third month.

The grandfather's family was subject to bleedings, especially from the nose. The grandfather and his brother and nephew had suffered from epistaxis. His sister and the child's mother had suffered from epistaxis and metrorrhagia, and both died in childbirth. All the family, the females in particular, bruised from the slightest knock.

The case seems to be one of hemophilia, chiefly affecting the females of a family, the disease being transmitted by both males and females.

A. W. BINGHAM.

HYGIENE AND THERAPEUTICS.

DOPTER: LOCAL EFFECTS OF DIPHTHERIA ANTITOXIN. (*Soc. Med. des Hôpitaux,* 1906.)

Following the plan of Martin, who used dry diphtheria serum in the form of pastilles, in order to limit the activity of the Löffler bacilli in the throats of convalescents, Dopter gave to his patients twelve pastilles a day. In a short time (about five days) the bacilli disappeared. Their presence after this time is an exception. Relapses are seldom observed. Gargles must not be used. Dopter used the serum in powder form in the nasal cases, but the effects were not so rapid.

G. R. PISEK.

BAKER, ALBERT R.: THE TREATMENT OF STRABISMUS IN YOUNG CHILDREN. (*The Journal of the American Medical Association,* July 13, 1907, p. 119.)

As almost every child is hyperopic, therefore almost every one is potentially capable of acquiring convergent squint, according to Baker. He shows from a table that nearly 75 per cent. of monocular squints develop before the fourth year. In alternating cases 53 per cent. began before the second year. He believes treatment should begin with the first appearance of the squint, and that any child who is old enough to squint is old enough to wear spectacles. The author has had such good results from correction by glasses, that he believes the operative treatment of strabismus should be practiced only as a last resort.

G. R. PISEK.

ARCHIVES OF PEDIATRICS.

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Original Communications.

PUBLIC SCHOOL EDUCATION.*

BY CHARLES GILMORE KERLEY, M.D.,
New York.

The education of a child, taken in a broad sense, "comprehends all that disciplines and enlightens the understanding, cultivates the taste and forms the manners and habits"† It means a preparation, a means to the end of fitting the child for a field of activity whereby his own life may be made more satisfactory to himself and of the most use to the State.

In order to bring this about, the curriculum must include instruction other than that which relates to things purely academic. The child must be taught how to live. This constitutes knowledge just as fully as an acquaintance with arithmetic or geography constitutes knowledge, and its acquirement calls for an exercise of those higher mental processes which develop the reasoning faculties. If we have the best interests of the child at heart we must, as Bacon puts it, "determine the relative value of knowledges." "How to live. That is the essential question. Not how to live in the mere material sense, but in the wider sense; the general problem which comprehends every special problem, is the right ruling of conduct in all directions and under all circumstances. In what way to treat the body; in what way to treat the mind; in what way to behave as a citizen; in what way to utilize all those sources of happiness which nature supplies. How to use all our faculties to the greatest advantage to ourselves and to others. How to live completely. To prepare us for complete living is the function which education has to discharge, and the only rational mode of judging of any educational course is the judging in what degree it discharges such functions."‡

Our subject will be considered from two standpoints—that which relates to the child's physical, and that which relates to his mental, development.

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* President's address before the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 26, 1908.

† Standard Dictionary.

‡ Herbert Spencer.

In the United States today there are 18,000,000 children in attendance at the public schools. The school year has been increased from three months to ten months. Owing to changed conditions of living in all classes, as a result of stress and competition, of social duties and amusements, or to indifference and indolence, parents see comparatively little of their children—much less than fifty, twenty-five or twenty years ago. The chief control of the child has been transferred from the home to the school, which means that the duties and responsibilities of the public school have increased tremendously.

An immense majority of these 18,000,000 children will complete their schooling between the fourteenth and the sixteenth year. They will pass out of the school door to take up the world's work. What do they know? How are they prepared for complete living? I have known a great many boys and girls who completed the grammar and high school courses. I have followed them through the years of their study and have watched their later lives. The child under fourteen years of age is by law, in New York State, required to go to school. If not, he is a truant, and his parents are subjected to a fine or other discipline. The State takes the child from his game, from the street, from the park, or from the field, puts him into the school and demands that he remain there five hours a day, five days in a week.

What is the child's treatment in the school? First, as relates to his physical well-being? In the last annual report of the Superintendent of Schools of New York City, the superintendent, Dr. Maxwell, referring to the manner in which the city cares for both the well and defective school children, writes as follows:—

"Sitting several hours a day at a desk which may not be hygienically constructed increases such diseases as curvature of the spine and often produces faults of posture, which the physical exercises of the class-room and the gymnasium barely avail to counteract. Defects in eyesight are certainly aggravated, as will presently be shown, by the work of the class-room. In short, though the school is doing what it may, with its present resources, to neutralize the evil effects of urban life upon children, yet these resources are inadequate, because they do little or nothing for those children who are suffering from a physical defect."

Six hundred thousand children in New York City schools are being compelled to read more or less for five hours a day in artificially lighted buildings without any consultation or investigation being made from the medical standpoint as to the effects.*

In the New York City schools, after the tenth year, there is practically no recreation period between nine and twelve or between one and three o'clock. Nominally there is a twenty-minute period, but this is usually taken up with other duties. Physical training comprises a part of the curriculum, but comparatively few children can avail themselves of it, because of lack of time or of physical defects which would render such exercises of no value.

"It appears, from the reports of the Board of Health, that over 30 per cent. of the children in our schools have a degree of eye-deformity sufficiently severe to interfere with their progress from grade to grade. It is reported, from sources that are apparently trustworthy, that in some schools a very much larger percentage than this of children who have been in school for two years or more have such eye-deformities and that this is due to the deficient light in these buildings. These eye-deformities increase from year to year throughout school life with such regularity that it is almost possible to place a certain grade by reporting upon the percentage of eye-deformity found among its members."†

As a general proposition there should be no choice between health and education; only that education is effective which is founded upon, and which secures, good health.

The superintendent's suggestion, that a department of hygiene be organized to coöperate with the Board of Education, is most timely. Such a board should be made up of a skilled oculist, an orthopedist, a laryngologist, a pediatrist and a sanitarian, who should be given power to arrange suitable type and printing for the different ages, to consider problems of ventilation and lighting, of posture, of vision, of the nose and throat, of nutrition and growth and of general hygiene and to direct the recreation periods. A standard of control—a health clearing-house—should be established as to what would be considered the normal requirements for the various ages.

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* Dr. Luther H. Gulick.

† Dr. Gulick, Ninth Annual Report, Superintendent of Schools. New York City.

Obviously oculists, and other specially trained physicians only, are competent to direct the various means of maintaining and restoring health to the school child, and as such should constitute an Advisory Board to the Board of Education and the City. The contagious disease should remain where it is, in control of the Health Department, but general medical inspection should be under the control of this Board of Hygiene.

"At a recent physical examination in Minneapolis, Minn., it is reported that only 17 per cent. of the children were defective. Boston reports 54 per cent., New York 60 per cent. and Sioux City 80 per cent. The range in eyesight is about the same. Columbus, O., reports about 25 per cent., New York about 30 per cent., while Wellesley, Mass., reports 63 per cent."*

Obviously such statistics are without value, excepting to prove that a large percentage of children are defective, and to suggest the necessity of establishing a standard that will apply to all schools.

A review of the work of medical inspection and of sanitary regulations in general is of interest.* The first regular medical inspector in America was Dr. Morreau Morris, who was appointed in New York in 1892. There is but one state (Massachusetts) which has a law providing for medical inspection in all the schools. Only sixteen states provide for fire-escapes and fire protection. Only Massachusetts and Connecticut have established a standard of ventilation and require its enforcement. Kentucky alone provides standards for lighting, floor spaces, air spaces, seating and water supply. Only one-third of the states compel vaccination. In the great State of Indiana there is no medical inspection. The Secretary of the State Board of Health of Iowa has recently published an article against medical inspection.

The general neglect and haphazard methods of handling this vitally important matter; the conflicting views and opinions as evidenced by the laws in operation, and by the absence of laws, demand that the subject of school hygiene, and of education of the young in general, be placed under Federal, instead of State, control, even if a constitutional amendment is required to bring it about. If the figures given as related to defectives are true, the United States is sustaining much financial loss and is greatly handicapped in attempting to educate children who are in such a physical condition that they will not profit by the instruction offered. The expense to the State of maintaining a child in school one day is twenty-four cents. The necessity of helping this situation, of stopping this waste, emphasizes the necessity of wise medical guidance. The Americanizing of the large alien population involves their receiving new habits of life with reference to health and the care of their own children, and demands the exercise of much care and labor by physicians.

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* Dr. Gulick.

A large fraction of the children that are in our city schools either themselves come from non-English-speaking countries or are children of those who come from these countries. That a large proportion of the population of our great cities is made up of persons from foreign parentage is not generally realized. The facts as told in the late census in regard to some of our leading cities are as follows:—

POPULATION OF NATIVE AND FOREIGN PARENTAGE IN 1900.

City.	Per Cent. Foreign.
Boston	77.2
Chicago	77.4
Detroit	77.4
Jersey City	70.5
Milwaukee	82.7
Newark	82.8
New York	76.9
St. Paul	72.6
San Francisco	82.1

After giving the child reasonable sanitary accommodations, and after using means to place him, and keep him, in the best physical condition, we would beg leave to suggest certain changes in the curriculum. We would have the boy and girl who are to go out in life at the fourteenth or fifteenth year of age taught reading and penmanship, geography, history and arithmetic, and given industrial and trade instruction. These are essentials as necessary to complete living and will be useful throughout the life of the individual. The curriculum of the elementary and high schools, however, includes more than these. It includes modern languages, music, Greek and Spanish history, zoology, commercial law, etc. We have no criticism to offer against these studies, excepting that they are non-essentials and crowd out other instruction which comprehends the essential. And, further, such studies are time wasted for the great majority, who will quit school life at the fourteenth or fifteenth year.

Among the essentials I would include religion. Any preparation for life is incomplete without a reasonable conception of its ethical principles. Many children never attend Sunday-school. In many instances, religious instruction is not given in the home, although, as a necessity to complete living, it comprises an important part of education and should be taught in the school. I realize that this is a most delicate and difficult matter to deal with, but it must be solved. There is no question but that the need exists. Departmental work is carried on in all schools. The State forces attendance at the schools and dictates to a considerable degree the course of study. It should provide religious instruction for those who want it, at least in all large cities where it is needed most. Protestants (and I am one) need it the most, because the home training is weaker than in the other faiths; at least, this is my observation.

The necessity for a sound religious training for the development of rational religious conviction is demonstrated in the spread of the Christian Science dogma, the creation of a mind diseased, to which thousands are adherents. These converts are rarely of the Catholic or the Hebrew faith.

Social Prophylaxis.—Morrow, in the *Maryland Medical Journal,* of September, 1907, states that competent European observers agree that 75 per cent. of the adult population have, or have had, gonorrhea, and that from 10 to 18 per cent. contract syphilis. He believes it conservative to state that the morbidity from both these infections in this country would be present in 60 per cent. of the male population. Gynecologists tell us that from 60 to 80 per cent. (different writers varying somewhat) of the acute inflammatory pelvic disorders in women are due to gonorrhea innocently acquired, and that 35 per cent. of all operative pelvic conditions in women have the gonococcus as the etiological factor. Thirty per cent. of the cases of blindness are attributed to the gonococcus, the infection being acquired at birth. It is estimated that 50 per cent. of the cases of gonorrhea in men are contracted before the twentieth year, and in practically all instances the patient possesses little or no knowledge as to the gravity to himself or the far-reaching and terrible consequences to others.

An important feature in the boy's education is here neglected. "The ideal of a good education to which most parents cling is one which entirely ignores the existence of sex, the most important feature of life. Through a lack of courage, or through a sense of false modesty, the system of generation is looked upon as a system of shame. This impression is so fixed and grounded in the mind of youth that it is apt to dominate his mental attitude throughout life. This sex instruction, to their sons so inauspiciously begun, is then committed to haphazard sources, to servants, to old or dissolute companions, and quack literature."*

It is the duty of the medical profession, who are in a position to appreciate the necessity of such instruction, to insist that it be carried on through the proper channels, the schools, by ways and means which seem best for those expert in training the young.

Let it be taught what constitutes morality, but do not neglect the physical side of the subject. The possible consequences of transgression should also be known. I have known three girls who became pregnant in the thirteenth year and not one of them knew the nature of the sex relation.

It is not claimed that proper instruction along the above lines would remedy all the evils referred to, but for right living a knowledge as to what constitutes it is required, and when the impress is made in the right way upon the impressionable mind of youth, much good will result, and we would not hear it said, as I have heard it time and again, "I did not know that such things were."

Alcohol and Narcotics.—One of the great scourges of the earth is intemperance in the use of alcohol. This is a practice which is the direct or indirect cause of more crime, poverty, diseases and untimely death than any other one factor, and yet it is passed over in our public institutions of learning with but meagre attention, in spite of the fact that laws exist in all the states which require that such instruction shall be given. It is interesting to note that these laws, making such study compulsory, have been secured almost wholly by the efforts of women, led by the late Mrs. Mary H. Hunt, of Boston, who for twenty years gave her whole time and fortune to the task. Physicians as a body have done but little in this direction.

I judge that this study is neglected from the knowledge of the subject possessed by the New York City finished product at the fifteenth or sixteenth year of age. In order to give the child what he has a right to demand, and for his own interest and his own protection, he should know the effects of alcohol, immediate and remote, as well as he knows the multiplication table. I am not advocating prohibition, or that it be taught. I speak for the boy and girl in a personal and selfish sense only.

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* Morrow.

An intimate association with a great many people in an active life for many years has resulted in the formation of a few additional convictions regarding educational matters. One conviction is that we are being educated to a danger point. State colleges and schools, semi-private and so-called private, are founded and endowed. Scholarships are supplied, not because of the law of supply and demand, but because some rich man or woman desires to ease a conscience or erect a lasting monument, with the result of making a certain proportion of the incompetent still more unfit. The next step which is in order, and not far in the distance, will be the offering of gratuities to students because students must be had. This factor in the life of the body politic, together with a spirit that exists in our public schools and in schools generally, is doing much to disorganize society. This spirit or sentiment is a species of madness and is a distinct Americanism. It is the desire for end results. It is the American spirit of "getting there" regardless of the method. We see it in our public life. We have all had ample demonstration of its operative possibilities in the business and financial world during the past year. This sentiment in the schools has been deplored by as eminent a teacher as Dr. J. E. Russell, of the New York Teachers College. This system of instruction appears to consist of a process of imparting specific information which is to be remembered, the end results being answers to questions. Actual knowledge, founded and acquired through processes of the reasoning faculties, is not particularly apparent in the finished product. I know not a few who show a lack of mental force, defective concentration and an absence of knowledge which should have been acquired during the training of this higher function.

The system of prizes and rewards for the best recitations, or set of answers in a given subject, is a bad one, as it overtaxes the pupil and it usually means a matter of memory. For certain excellence at recitation a boy patient, whom I was obliged to take out of a private school, received daily a red card. When he had five red cards he received a large yellow card. I asked him what the yellow card stood for. He did not know. He had worked so hard to get these yellow cards, the significance of which he did not know, that I was obliged to take him from school. He could scarcely hold a pack of these yellow cards in his hands because of the chorea which was present.

By suggestion and encouragement, if not by direct advice, the young of our schools are under the stress of a constant incentive to strain after greatness. Emulation is in the school air. Every boy in some way is made to believe that in him is the metal from which Presidents of the United States are fashioned; that out of such material as the great financiers, lawyers, physicians and teachers are moulded; that he ought to be great, and if he gets his lessons by some means or other, he is taking his first step toward so-called greatness. I look upon it as most unfortunate for the boys of this country that Abraham Lincoln split rails and was born in a log-cabin; that General Grant was a tanner; that Garfield drove mules before a canal boat, and that Russell Sage sold newspapers. In defence of this teaching it is claimed that high ideals should be placed before the young. The highest ideals do not have end results in the acquirement of wealth or power or position. Bringing a child up in an atmosphere thus charged is the inevitable cause of much disappointment, suicide and life failures, and for the reason that it is impossible to build a $10,000, $20,000 or $40,000 a year intellect in a two-dollar a day brain. This spirit, with the encouragement from all sources —endowments, scholarships and rich men's colleges—toward so-called higher education, induces youths to spend years in striving and end in failure more or less complete. This over-education of the unfit brings forth tastes, habits and desires of which he should not know, and is the cause of more thieving, gambling and all around dishonesty than is well appreciated. When position and wealth or reasonable competency do not follow by legitimate means, others are readily seized upon.

The labor question in this country is a most serious one. In times of usual prosperity it is well-nigh impossible to get workmen. During building operations which I had under way a few years ago, from $5 to $8 a day for a so-called eight-hour day was paid. In periods of depression, skilled laborers fare no worse than others. Among the boys whom I have known intimately during the past twenty years, sons of carpenters, shoemakers, plumbers, bricklayers, etc., I have known not one who wished his occupation to be that of his father. These boys would all be lawyers, bank presidents, physicians, etc., and, sorry to relate, some of them became lawyers or physicians. No bank presidents, but poorly paid bookkeepers they are today. None would be a wage-earner with the father, because of the efforts to make him think above it. All the professions are overcrowded with the disappointed unfit. I know physicians whose income from their practice is less than $1,000 a year. Ten per cent. of those graduated in medicine fail to make a living and seek other occupation. A few years ago, when I was experiencing difficulty in getting workmen at $5 a day, a lawyer friend advertised in a daily paper for clerks somewhat familiar with legal work, to do copying of a certain nature at a salary of $8 a week. Among those who applied were seventeen lawyers, who had been admitted to the bar of New York State. The great majority of bookkeepers, clerks and small business men and many male teachers have less earning capacity than the man with a trade.

I would impress upon teachers and the Board of Education this thought: "That labor is the inevitable lot of the majority, and that the best education is that which makes labor the most productive." For the boy who is to go out and become a member of the working class, as millions must, I would have inserted somewhere in the curriculum, somewhere between the Spanish history period and the elocution period, a few minutes devoted to a talk on honest toil and the nobility of labor, and that the only dishonorable work is that which is badly done. I would have boys taught reading, writing and arithmetic and the rudiments of a trade. Somewhere between the zoology and commercial law period I would have the girl who is to bring up a family of children, and who will have to do her own housework, get more than a passing glance at physiology, cooking, sewing and food values.

At this moment these 18,000,000 boys and girls in the public schools are not being furnished the physical advantages and protection that they have a right to demand. They are not being taught how to live.

And if we judge of our public school educational course according to the degree with which it discharges its function, we are forced to admit that it fails in its function.

A PLAN OF DEALING WITH ATROPHIC INFANTS AND CHILDREN.*

BY HENRY DWIGHT CHAPIN, M.D.,
New York.

The problem of dealing with the sick and ailing infants of the poor must occasion much thought to those who have worked a great deal with this class. The usual forms of charity intended for their relief consist in attendance at dispensaries, day nurseries, the visits of district physicians or nurses from dispensaries and settlements, the extending of hospital accommodations to proper cases and fresh-air excursions and homes in summer. But there is one disheartening feature that constantly confronts the worker who is seeking to permanently help these children, namely, their defective vitality from the wretched environment that so often surrounds them when returned to their homes.

They frequently pass from one institution to another, each one contributing its share of effort, but really not able to do more than temporarily relieve the most urgent necessities. These poor little waifs thus pass on from hand to hand until their waning vitality is exhausted.

It may be said that the fault really lies in deficient and inefficient fathers and mothers, and much of the trouble undoubtedly is here, but, even so, better measures of relief should be sought and will often yield results that are surprising if continued long enough.

All purely institutional work for these children should be only temporary. After acute illness has been relieved, they should have other management. If they must be sent back to faulty life conditions at home after discharge from an institution, the relief afforded by the latter will often be of very temporary value. Neither is good accomplished by sending them to other institutions, as the collecting of many little children under one roof is not good for them, no matter how well managed the institution.

After a long experience with this class of cases the writer has found that relief can be much better accomplished along the lines of family life with individual supervision instead of the collective life with institutional methods. Acting on this idea, the Speedwell Society was inaugurated in 1902, and has since been in successful operation. The plan followed is the boarding-out system, and the results have been remarkably good, considering that bottle-feeding has been exclusively employed, as wet nurses have never been available. The cases have been placed in carefully selected private families in the neighborhood of Morristown, N. J., which affords a very healthy location. A doctor and trained nurse have oversight of the cases. The foster mother is instructed in feeding and otherwise caring for the baby. A supervising nurse procures the children from the city and returns them to their homes when discharged from the care of the society, besides attending to many other necessary details of the work. She also endeavors to see that improved methods of care and feeding are carried on after the child is returned to its home.

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* Read before the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 26, 1908.

The work of the society is not confined to the summer months. Children are received at any time of the year, and it is found that most valuable work can be done during the winter season. Neither is there any time limit for the keeping of the children. Each one is retained long enough to attain permanent improvement, or until it is proven that the case is hopeless. It is believed that it is better to permanently help a few than only temporarily to help many.

Most satisfactory results have been obtained in the cases of infants suffering from chronic malnutrition due to prolonged faulty care and feeding. In institutions, fed on the bottle, the vast majority of these cases will die, no matter how carefully they are nursed and fed. These babies should never be kept in institutions of any kind. The method of dealing with them should be changed. The experience of this society shows that, even on the bottle, a majority of them can be saved if a fairly good individual environment can be secured and careful oversight of the feeding maintained.

A hospital or institution of any kind should only serve as a temporary hold-up in cases of acute illness of infants, and they should always be sent out to recuperate after the acute symptoms have been relieved, and, if possible, to the country.

For the past six years the Speedwell Society has worked according to this method, with the following results: The first child was sent out March 19, 1902. The total number cared for from that date to March 19, 1908, is 817. The ages were as follows:—

Under three months	121
From three to six months	95
" six to twelve "	83
" one to two years	85
" two to five "	130
Over five years	303
	817

There have been 103 deaths at the following ages:—

Under three months	45
From three to six months	29
" six to twelve "	21
" one to two years	8
	103

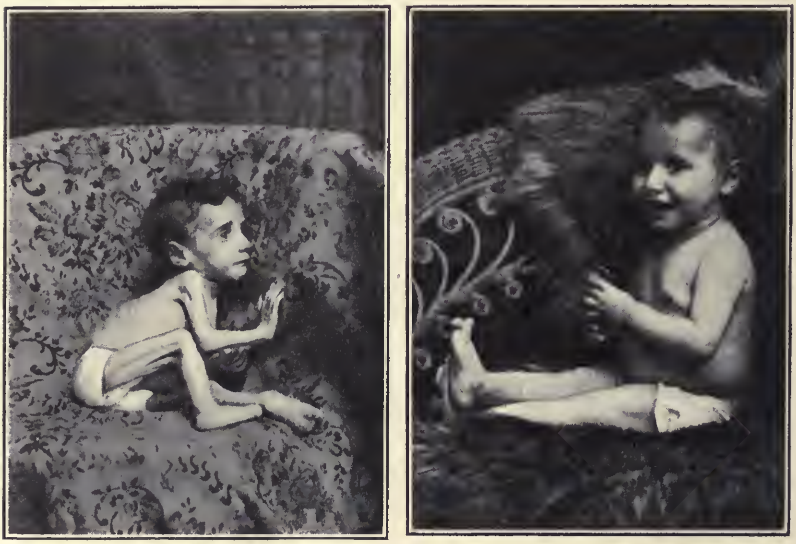
The following were the causes of death:—

Marasmus or wasting	21
Gastroenteritis	45
Enterocolitis (chronic with malnutrition)	22
Bronchopneumonia	6
Acute lobar pneumonia	1
Tuberculosis	1
Diphtheria	1
Scarlet fever	1
Cholera infantum	1
Meningitis	2
Premature infants	2
	103

The results of the method, as judged by the number of deaths, may not seem very brilliant to those unaccustomed to deal with this class of cases. In glancing over the tables we see that a little over one-third of the cases under three months died; a little over one-quarter between three and six months, and one-quarter from six to twelve months died. After the age of one year there were only eight deaths among 518 cases. The heavy mortality among this class is under one year. This period is very hard to deal with in thin, badly nourished, bottle infants brought to institutions for relief.

The boarding-out method, under careful supervision in the country, is the best plan yet devised to relieve and save these infants. The first series of 121 cases would nearly all have died under ordinary methods of handling, and yet almost two-thirds of them were saved. They were poorly nourished from bad hygienic surroundings, with various degrees of digestive disturbance from faulty feeding on the bottle, and stationary or losing weight. A large proportion were restored to fair and even vigorous vitality, although kept on the bottle.

A larger proportion were saved from three to six months and from six months to one year—in the first series nearly three-quarters and the second series quite three-quarters being the proportion saved. These are brilliant results, considering that artificial feeding was still of necessity exclusively employed.



Condition May 18, 1905. Condition September 8, 1905.

Fig. 1.—A case of extreme atrophy.

In some cases of marasmus the results have been really remarkable. As an example, Esther K., aged thirteen months, was sent out from hospital on May 18, 1905, weighing 9 pounds, 8 ounces. The extreme emaciation is shown in the picture. (Fig. 1.) She was returned on September 8, 1905, weighing 18 pounds, 8 ounces. In four months of this management she had doubled her weight and was a healthy, vigorous infant.

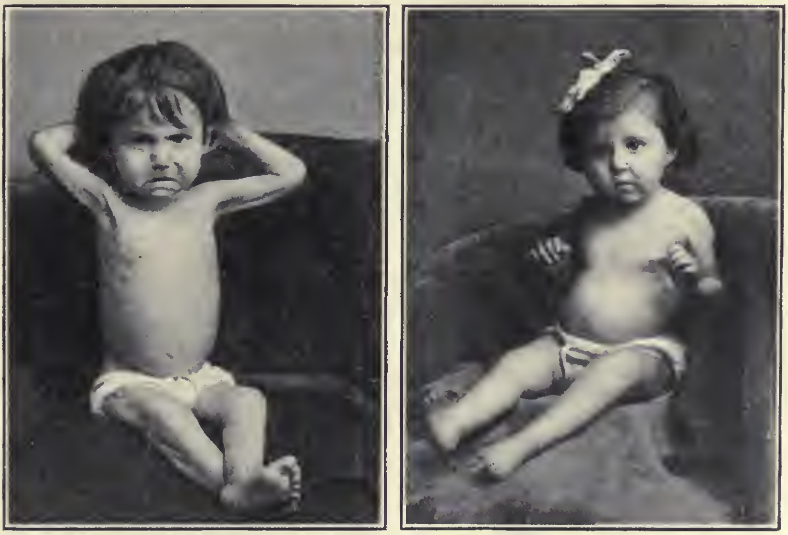
Morris R., three months; weight 5 pounds, 8 ounces—less than birth weight, and slowly but constantly losing. He was kept from January 19, 1903, to November 20, 1903, when he was returned, weighing 25 pounds—a gain of nearly 15 pounds in ten months.

Bessie M., fifteen months, weighed 14 pounds, 12 ounces on being received, November 22, 1905. She was sent back February 15, 1906, weighing 23 pounds. (Fig. 2.)

These cases are used as illustrations and are not so exceptional as might be supposed. They show that wasted infants can often be restored to proper vigor and development if handled in the way here proposed.

While wasting in infants is largely due to faulty diet in its inception and continuance, yet when the atrophy has proceeded to a certain extent the change to a proper diet is not usually sufficient to check the downward trend. These cases require, in addition, an altered environment that will furnish plenty of fresh air, good general hygiene and individual care. For this reason they never do well in institutions, no matter how carefully and scientifically they are fed. They cannot assimilate the best of food without an abundance of good air to assist in its oxidation; oxygen is as necessary a food for them as proteid or fat. It is only individual housing and care with constant oversight that can accomplish good results.

In the work at Morristown twenty-four families have been employed. Some do better than others, and the doctor and nurse have them graded in their own minds as to their success and efficiency. Some of the foster mothers have been very successful in nursing feeble infants back to health, and take the greatest interest in the work. We aim to encourage them by praise, as the pecuniary reward—$12 per month—is small, but they feel they are engaged in a great undertaking. Some tire of the work, and others are dropped because of inefficiency. The tact and good judgment of the supervising matron are constantly called into play in retaining old homes that are satisfactory and in



Condition November 22, 1905. Condition February 15, 1906.

FIG. 2.—A case of atrophy with rickets.

selecting new ones, but she knows the locality and the people, which is most necessary in such a work. Systematic, careful study of the field of operation is required if such a work is to succeed. Desultory, haphazard methods will not avail. The same care, routine and system that are usually brought to bear in institutional work must be applied here. There is nothing in common between the work of a well-organized society engaged in such an effort and the old-fashioned baby farming. The latter was justly abandoned, owing to the many abuses that sprang up in connection with it. In the Speedwell Society not more than one infant was placed in one family. Natural surroundings are thus insured and the danger of infection reduced to a minimum.

Briefly summarized, the plan that has worked well, and is advised in future dealing with neglected infants suffering from marasmus, comprises the following features:—

(1) Boarding out in a certain district of the country noted for its healthful conditions.

(2) Constant attention to diet and hygiene on the part of a doctor and nurse who are familiar with this class of cases and competent to deal with them.

(3) The infants are kept as long as necessary, until feeding is regulated and digestion and assimilation are improved sufficiently to result in an increase in weight. The work is continued during all seasons.

(4) The training up in a given neighborhood of a number of foster mothers, who, by constantly taking these infants into their homes, become expert in handling them under conditions totally unlike those offered by the best institutions and far superior to them.

If such a plan is carried out, a large majority of these infants and children can be saved. No capital is required to be tied up in a building. The visiting doctor and nurse should be paid a salary, and outside of this, all the money given goes directly to the board of the children. If contributions fall off, the work is contracted until more comes in, when it again expands—resources and efforts thus acting automatically. The plan has been proven to be economically sound as well as practically efficient.

Every crowded community having much destitution can best look after its little waifs and strays and save most of them by arranging to board them out in a neighboring countryside under careful oversight, according to the method of the Speedwell Society.

AN UNUSUAL TYPE OF ACUTE NEPHRITIS IN CHILDHOOD.*

BY JOHN LOVETT MORSE, A.M., M.D.,

Assistant Professor of Pediatrics, Harvard Medical School; Assistant Physician at the Children's Hospital and at the Infants' Hospital; Visiting Physician at the Floating Hospital, Boston.

I have recently seen a number of cases of acute nephritis in childhood in which the characteristics of the urine have been materially different from those of the ordinary form, the chief differences being the complete, or almost complete, absence of blood and blood elements and the presence of a large number of small, round mononuclear cells, often associated with a considerable number of polynuclear leukocytes. There can be no doubt that these cases were acute and not chronic. The course was essentially the same as in other forms of acute nephritis, with the exceptions that the duration was usually shorter and the prognosis somewhat better. The following histories illustrate this type very well.

A boy, eleven years old, had had scarlet fever and measles when four, and diphtheria when four and one-half, years old without any complications. Since then he had been perfectly well, except for adenoids, which had been removed two years before. He went to the country about the first of August, 1907, and while there had no illness. August 17th he complained of a slight headache, and it was noticed that his eyelids and face were puffy. There were no other symptoms. He entered the Children's Hospital August 20th. The physical examination was negative, except for a little puffiness of the eyelids, which disappeared in forty-eight hours. There was no accentuation of the second aortic sound, and no enlargement of the left heart. The urine was yellow, acid, 1.030, and contained 0.2 per cent. of albumin. The sediment showed numerous short hyalin and fine granular casts, many leukocytes and a moderate number of small, round cells. The urine of the 26th was acid, 1.023, and contained no albumin. The sediment showed a few hyalin and fine granular casts, a moderate number of leukocytes and a few small, round cells. On the 29th albumin was still absent, but the sediment showed a few coarse, granular casts, a moderate number of leukocytes and a few round cells. He was discharged September 4th, having had no symptoms what ever, the urine then being perfectly normal. The urine has been examined a number of times since then and has been found normal. The boy has continued in good health. The quantity of urine, beginning August 24th, was 15, 22, 30, 30, 20, 26, 26 and 26 ounces.

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* Read before the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 25, 1908.

This case is an example of the mildest type of the disease, with no blood or blood elements in the urine. It is impossible to say, of course, that blood may not have been present in the first few days, but as he was apparently seen on the third or fourth day, it seems very improbable.

In a number of cases which I have seen there has been a moderate amount of blood in the beginning, which has disappeared after a few days, the urine then taking on the characteristics already spoken of. The following case is an example. In it, however, the amount of blood was greater and it persisted longer than is usual.

A girl, eleven years old, had always been perfectly well, except for some pulmonary trouble for a few weeks when she was five years old. She was taken suddenly sick eight weeks previously with vomiting and slight edema of the face and feet. The urine was examined at once. It contained ⅛ per cent. of albumin and showed the characteristic sediment of acute nephritis. The blood elements disappeared very quickly, however, and did not return except for four or five days about a month from the onset. The urine increased from 1 to 3 or 4 pints daily. In spite of this, the edema recurred and free fluid appeared in the abdomen in the seventh week. The sediment showed no blood elements, but a good many hyalin, fine granular, coarse granular and epithelial casts of large diameter, and a very large number of small, round mononuclear cells with rarely a polynuclear leukocyte. The amount of urine diminished somewhat during the next few days, but the character did not change. Convulsions developed a few days after she was seen and were quickly followed by death.

The following case, which has been followed very carefully for the last two years and a half by the physician with whom I saw it in consultation, is a striking example of this condition. Blood and blood elements were present for a time in the urine, but always in very small amounts.

A girl, four and one-half years old, began to have a sore throat and coryza June 16, 1905. She had no fever, but one cervical gland was slightly enlarged. There were also a few enlarged follicles on the posterior pharyngeal wall. The temperature continued normal. She was kept in bed as a precautionary measure on the 17th and 18th. There was a little swelling of the legs on the 22d, which was followed the next day by puffiness of the lids. The swelling of the legs was more marked on the 24th. The urine was then normal in color, acid, 1.026, and contained ½ per cent. of albumin. The sediment showed many polynuclear leukocytes and a few small, round mononuclear cells. There were numerous hyalin and fine granular casts of medium diameter, and very rarely an abnormal blood corpuscle. Two days later the urine contained 1 per cent. or more of albumin, and there was rather more blood, both normal and abnormal. The urine of July 7th contained 0.7 per cent. of albumin, many polynuclear leukocytes, an occasional small, round mononuclear cell, many hyalin and fine granular casts of large diameter, some of which were fatty, and very rarely an abnormal blood corpuscle. August 4th the urine contained 1.2 per cent. of albumin. The sediment showed very many polynuclear leukocytes, some in clumps, many large, round, dense cells, some caudate cells and a few fatty, small, round mononuclear cells. There were many hyalin and fine granular casts of large diameter, some fatty and some with a few cells adherent. There was also a moderate amount of abnormal blood. No blood was found in the urine after September 1st, except during a period of two or three days in late October. The urine a year later contained about 0.1 per cent. of albumin, a few polynuclear leukocytes, free and in clumps, a few small, round mononuclear cells, and very rarely a granular and hyalin cast, with occasionally a fatty cell adherent. The urine was absolutely normal March 6, 1907, and has remained so since, except for a short time in May, 1907, during an attack of whooping-cough, when it contained a very slight trace of albumin and an occasional cast. The amount of urine was somewhat diminished and the specific gravity high during the first two months, after which it was passed in normal amounts. The amount of albumin varied between 0.5 per cent. and 1.5 per cent for some months, remained at about 0.5 per cent. for a number of months, dropped to 0.1 per cent. in about a year, and disappeared entirely in about twenty months. The most striking things about this urine were the very small amount of blood in a very acute condition, the large number of cells, both polynuclear and, to a less extent, mononuclear, and the large diameter of the casts. There was marked edema for a considerable period and, for a time in the beginning, ascites. The child has been perfectly well, both subjectively and objectively, for at least one and one-half years. She shows no signs of increased blood pressure. One cannot help feeling, however, that a chronic nephritis may eventually develop.

In some instances, not only is blood absent, but very few other renal elements are found, even when the symptoms are marked and there is a large amount of albumin. The following case is an example:—

A boy, twelve years old, who had always been unusually well and strong, had a moderately sore throat for a few days, beginning November 11th. The cervical lymph nodes were slightly enlarged, but there was no fever. He was not as well after that, got tired easily, and complained a little of shortness of breath on exertion. He complained of fullness in the head, had a slight diarrhea and nausea, and ran a temperature varying from normal to 101.5° F. for two or three days, beginning December 3d. The tonsils were slightly enlarged and reddened, and the enlargement of the lymph nodes persisted. He vomited December 7th and 8th. The urine on the 7th was high colored, 1.018, and very acid. It contained no sugar, but about 25 per cent. of albumin by bulk. The sediment showed a moderate number of granular casts and some polynuclear leukocytes, but no blood or blood elements. The amount was 1 quart. He complained of frontal headache and at times was slightly delirious, although he passed a reasonable amount of urine containing from 15 per cent. to 30 per cent. of albumin by bulk. He had several convulsions the morning of the 13th. Under treatment the amount of urine then quickly increased and the albumin diminished in quantity, disappearing entirely on the 22d. At no time were any blood or blood elements seen, while cells and casts were very infrequent. Now, a year later, his urine is perfectly normal and he is well in every way.

It is very evident from the examinations of the urine in these patients that the type of nephritis from which they suffered is different in many ways from the ordinary form. It differs from the usual form in that blood and blood elements are either absent or present in very small amounts, in the presence of large numbers of polynuclear leukocytes or small, round mononuclear cells, and in the comparatively large diameter of the casts. It does not differ in its symptomatology and course from the ordinary form of acute nephritis, unless it may be that on the average the cases are milder and the duration shorter. It may, however, as shown by these cases, eventuate in death, be accompanied by convulsions, or possibly develop into a chronic type.

I am entirely ignorant as to the pathology of this condition, never having had a case autopsied. The text-books say little about it, either because it is uncommon or because it is so common that it has not seemed worthy of mention. The only description which I have seen which seems to fit this type of case is one by Heubner. He describes in his text-book a type of acute nephritis "which is most common in diphtheria, but may occur secondary to other diseases, or even apparently primarily, in which the blood vessels are little, if at all, involved, and the cells of the tubules markedly degenerated. Hemorrhagic changes are extremely rare. The convoluted tubules are most involved, the descending limb of Henle's loop next. The urine is almost never bloody, the amount of albumin is moderate. The urine contains hyalin casts, casts with a little epithelium, renal epithelium and rarely leukocytes. The duration is usually short, varying from one and one-half to two weeks. There is seldom edema, more seldom uremia. Chronic nephritis develops even more rarely than in the ordinary acute type after scarlet fever."

This description does not quite fit these cases, however, because, although the urine did not contain blood, it did contain, as a rule, a large number of cells, either polynuclear or mononuclear, and the majority of the casts were of large diameter. It seems probable, therefore, that the pathological changes in these cases are somewhat different from those in the cases described by Heubner. Judging from the absence of blood, there is, in all probability, little or no change in the glomeruli, and, judging from the number of cells and from the large diameter of the casts, the pelvis of the kidney and the lower tubules are more involved than those higher up. In all probability, therefore, the condition is one of pyelonephritis rather than the ordinary acute glomerular or interstitial nephritis.

DISCUSSION.

DR. KOPLIK.—Dr. Morse's paper calls to mind the description in Osler's symposium on typhoid of the kidney trouble, in which there are leukocytes and casts in the urine. I have a case now under observation in which the existing nephritis probably resulted from gastroenteritis, and in which the urine shows small and large cells and casts. The question in these cases is how to distinguish them from infectious nephritis with cystitis. In these cases of gastroenteritis followed by nephritis, especially in young female children, there is a question of involvement of the ureters and bladder.

DR. J. H. MASON KNOX.—One of the cases I shall report in my paper on urinary changes in gastrointestinal disease corresponds very closely with the description of Dr. Morse's cases. There was hematuria, a number of leukocytes, a small amount of nuclear cells and a number of casts. The case ran a very chronic course and came to autopsy. Section of this child's kidneys showed the convoluted tubules undergoing hyalin degeneration, the nuclei not staining at all. It seems that this belongs to this group of cases in which the degenerative changes are the most marked features.

DR. LA FÉTRA.—I had 1 case that corresponds quite closely with Dr. Morse's first case. In my case the leukocytes persisted for a long time after disappearance of the casts. I tried very hard to discover the origin of the condition, but was unable to find anything at all. The child was otherwise in good health, and the only thing that called the mother's attention to the condition was some puffiness of the eyelids.

PHIMOSIS.—Witzenhausen (*Münch. Med. Woch.*, May 28, 1907) asserts that in early boyhood phimosis should receive more attention than it is accustomed to. It may be the cause of internal diseases in boys in which obstipation and its consequences are prominent. It exerts a harmful influence on the intestinal organs and the digestive power of the children which persists in later years when the primary cause has long passed away; it is known that self correction of phimosis is frequently the case, may affect the entire constitution and predispose to other diseases. Therefore, as soon as symptoms appear which may be ascribed to the phimosis this condition should be remedied as quickly as possible. The most certain correction is by circumcision.—*New York Medical Journal.*

OBSERVATIONS UPON THE COLORED CHILDREN OF JAMAICA, WITH ESPECIAL REFERENCE TO RICKETS AND TO MONGOLIAN SPOTS.

BY ALBERT E. VIPOND, M.D.,
Montreal.

While on a visit to the Island of Jamaica I thought that I might employ my time profitably in making an examination of over 200 children of colored origin, who live in the poorest districts of Kingston, and compare them with the white children who live in a northern city, such as Montreal, and who are exposed to all the ills consequent upon extreme poverty.

During this examination I paid particular attention to the different diseases which would affect the children living in a northern climate. I next looked for diseases which would be peculiar to the Island, and arrived at the conclusion that the colored children as a whole are up to a certain age healthier than those up north who live in poverty.

My examination included children ranging from one day to fifteen years of age. Most of the mothers nurse their children until they are six months old; some keep on nursing them until they reach the age of eighteen months. From their earliest age these nurslings are also given some form of starchy pap. As soon as they are weaned they are fed upon rice, bread, potato, yam, banana, casava, cornstarch, etc. If the children cannot be nursed they are fed upon goat's milk or condensed milk; however, most of the infants who are not breast fed are given the above starchy diet. Most of the foods mentioned contain about 60 to 70 per cent. of starch in the dry state. It is generally believed that this diet is responsible for a large proportion of rickety children found throughout Canada, England and the United States, but I must say that it is a rare event to find rickets in a colored Kingston child.

I made a careful examination for rickets in the young children and was more than surprised to find that they were practically free from this disease. At most, I found one rickety head, one or two with delayed walking, and a few with bending of the ribs. I did not find one aggravated case of rickets in Jamaica. The question arises: Why are those children practically free from rickets? They are given a food which we are led to believe tends to be a suitable diet for rickets. Many of the children are nursed, but, as a rule, they are either taken away from the breast too soon or are kept at the breast too long. However, over-lactation with the addition of starchy food, we are taught, tends to produce rickets. I admit that those children live out of doors during the day time, but the nights are passed in little shacks with the windows and jalionses religiously closed, so that they scarcely get a breath of air. The little houses are in small yards crowded together and measuring about 9 x 13 feet in size. So that these young children exist almost exclusively on starchy food, and although having plenty of fresh air during the day sleep in poorly ventilated houses. Hence they have every opportunity to develop rickets, but they do not do so except in rare instances.

I must admit that for some time past my views as regards the causation of rickets have somewhat changed, and the results of my examinations tend to add to my skeptical frame of mind. We must look for more than an unsuitable diet and impure air as factors in the causation of rickets. In our northern climate the presence of rickets is invariably associated by the practitioner with an unsuitable diet, the fats and proteids being too low and the starch being away in excess of what it should be in a diet suitable for young children. Again, fresh air most likely has been at a minimum figure. We must look for more than those two factors. If rickets depended altogether upon food and fresh air I would expect to find that about 50 per cent. of the children of Kingston would have rickets, but we only find that about 2 or 3 per cent. are so affected.

For some time past I have thought that a personal factor must be taken into consideration in looking for the causation of rickets. In other words, in the rachitic child there must exist a vulnerability or want of resistance. I do not think that rickets is inherited or is congenital (except in rare instances) to any greater degree than is tuberculosis; but I do think that there is inherited a predisposition to rickets the same as in tuberculosis, and if a child is exposed to the causes which produce rickets it will readily develop the condition; the same causes, however, brought to bear upon another child who has not been born with this predisposition will not result in this disease. If this were not so how can we prove the exemption of the West Indian colored children from rickets? Again, how is it that one or two children in a large family will develop rickets, and that the other children who are brought up under identical conditions escape entirely? Again, in the case of twins we at times see that one will have rickets, the other be quite free from the disease.

Rickets is a family disease; and, furthermore, it will be found that many mothers who have rachitic children have had rickets themselves. Some families have children who are prone to develop the disease, while other families, who live under the same conditions as regards diet and fresh air, seem to escape altogether. Further, rickets is a selective disease. It will act upon a vulnerable system in one child, and the child may develop convulsions, tetany, laryngismus stridulus, facial irritability and other nervous manifestations of this disease. Rickets in this case seems to pick out the nervous system and leaves it in such an unstable condition that the least excitant appears to produce a motor discharge. The child is ready to have a convulsion, when exposed to the slightest irritation, from improper food, constipation, etc.

In another little individual we find that the nervous system appears to be quite normal, but he has a distended abdomen, the rosary is well marked; he is stout and happy—a good advertisement for some patent food; the child is often constipated for obvious reasons. In this case the nervous system is not at fault, but the digestive system appears to be the vulnerable part of his anatomy.

In a third child you will find that the nervous or digestive systems, do not appear to be at fault, but that the muscular is the system affected. He may have reached eighteen months of age and cannot stand upon his feet, and is brought to the physician because his mother thinks that he is paralyzed. On examination it is found that the muscles are soft and flabby and that the ligaments lack tone; the little limbs can be bent in any direction at the joints.

Again, in yet another, we find that the bony system is most at fault. If the child has reached the age when it should commence to walk and attempts to stand upon its feet, it may develop bow-legs, knock-knees, lateral curvature of the spine, curving of the long bones, etc. If no attempt has been made to walk it may develop the postural deformities of rickets; the legs and arms are curved, the characteristic chest deformity appears, and the clavicles may be deformed from green-stick fracture. During the past year I have seen 2 cases of this form of fracture of both clavicles, and I may say here that I am convinced that they were fractures and not merely a bending of the bone, as in each case an amount of callus had been thrown out. The head is characteristic of rickets, etc. The brunt of the trouble here seems to have been put on the bony system. In this instance the digestion appears to be in good condition, the muscles and ligaments are in a fair state, while the nervous system does not present any evidence of abnormal irritability.

In a fifth child it will be seen that the digestive system is in fair condition. The nervous, bony and muscular systems do not give much trouble, but the blood is at fault. The child is markedly anemic, the skin and mucous membranes are pale, the spleen is enlarged and frequently the liver is in the same condition. Some of these cases are true types of Von Jaksch's anemia—we get the anemia, enlarged spleen and the blood changes characteristic of this disease.

I think that to this list we might add a sixth, or what we may term a mixed group. In this last we may find any two systems involved at the same time, as the nervous and bony systems, or the muscular and digestive systems may be gravely disturbed at the same time.

Consequently I think we can with advantage divide rickets into six system groups:—

1. Nervous,
2. Digestive,
3. Muscular and Ligamentous,
4. Blood,
5. Bony,
6. Mixed.

All the children examined by me were either pure black or had colored blood in their composition, and I have divided them into four groups for the sake of convenience:—

1. Black, with no known admixture of white blood.
2. Three-quarters black, with a Sambo father and a pure black mother, or *vice versa.*
3. Sambo children, with half black and half white blood.

4. Light, with a white father and a Sambo mother, or *vice versa.*

A great many of the parents gave a history of the children having had malaria, so that I made a careful examination for an enlarged spleen. I was surprised, however, to find this condition present in only 1 child, hence not much faith can be put in the statement of the children having had fever, as they call mostly every disease malaria. I was told that yaws was fairly common in this district, but I failed to find 1 case among the 217 children examined by me; however, there are many cases to be found in different parts of the Island. I was surprised not to find 1 case of congenital syphilis among those children, considering that I examined the poorest children in Kingston and that this disease is not uncommon among the Negroes of Jamaica. Nervous diseases are not common; the little black child seems to have a pretty stable nervous system.

Among organic diseases of the nervous system I found 1 case of congenital diplegia, another case of infantile hemiplegia and 1 child was deaf and dumb. A young girl of fifteen years suffered from loss of sight and other symptoms which suggested a postcerebrospinal condition. Epilepsy is not common in the young Negro child. I came across only 1 case suffering from this trouble.

Enlarged tonsils and adenoids are not common among the black children; I only met with 6 cases, or about 3 per cent. They were of a mild type and not one of them exhibited the typical adenoid expression. The temperature is fairly even on the island; there is not much variation between summer and winter. At the time of writing it is winter, and the temperature has been over 89° F. in the middle of the day; however, the nights and mornings are cool. An important point in this connection is that while the black children are practically free from enlarged tonsils and adenoids, it is a common affection in the white children, both in the Creole and in those who come out from England or America to make Jamaica their future home. It is an affection of the white children and not of the black children.

Here again I think that enlarged tonsils and adenoids is a congenital condition. Some children are born with an excess of lymphoid tissue in the nasopharynx. Again it appears to be a family disease; many families escape altogether, while in others all the children have to be operated upon to give them relief. The slightest cold in those children, or irritation by dust, such as obtains in Kingston at the present time (the limestone dust from the fallen earthquake buildings being constantly in the atmosphere), will set up an active growth of this pre-existing lymphoid tissue.

I do not find any of the children wearing glasses.

Ear diseases are very common. This is to be expected.

Although the temperature is very high at the present time I only met with 1 case of diarrhea. One child of six or seven years had dysentery. I am convinced that given a temperature of this height in Montreal or in New York I would have come across many cases of this trouble.

Three children were suffering from a mild type of malaria.

Skin lesions are common. Several had eczema, others a pustular eruption, most likely caused by scratching with dirty fingers; several were marked with mosquito bites. I came across several cases of leukoderma, mostly of the patchy type.

Most of the children had fine teeth, the beautiful whiteness of which would put many a white child to shame. Many of the children presented distended abdomens; this is largely produced by the quality of food eaten by them, which is usually of a starchy nature.

In my wanderings I met with 2 cases of albinism in the colored child. The first was not typical of the negro albino, as the little girl, who was twelve years old, was partly white; however, she was a typical albino, and nystagmus was marked in this case. The second case was in a lad of about sixteen years of age, whose parents were black. I must say that he was extremely ugly, his skin was white, but his whole body presented a reddish hue; his hair was short and curly, but of a yellowish or golden color; the eyebrows and eye lashes were quite white. The nose was broad and squatty, the lips thick and large. The eyes were typical of what one sees in a white albino, and he squints at one with half-closed lids. Nature's pigment is practically absent in this individual. The lad was a Negro, but at the same time was a typical albino; he was well developed and very sensitive about his condition. I was pleased to meet with this case, as it is rare to find albinism in a Negro.

I examined carefully the lymphatic system in the children under observation. Out of the number examined about 100 live in Smith's Village in Kingston—this is the poorest and most crowded district in the city—20 were from the middle of the city and about 80 from Alman Town in Kingston; this is a much better and cleaner district than Smith's Village. Sixteen of the 80 children had enlarged nodes in the neck, axilla, or in both, and 30 were among the other cases. It will be seen that 25 per cent. of the poorer children had enlarged nodes and only 20 per cent. of the children living in the healthier district. The irritation of the skin produced by the rashes and scratching had, I think, some influence in producing this condition of the nodes.

The question arises, what part might the malarial parasite play in producing this chronically-enlarged condition of the nodes? The enlargement is quite different from that found in the acute infectious diseases; they are not tender and actually inflamed, but, on the contrary, are quite hard and remain indefinitely enlarged, nor do they resolve as in acute infectious diseases.

Umbilical hernia is quite common, and I was surprised to find 24 cases of this form of hernia among the 217 children examined. This means that over 10 per cent. of the children suffered from umbilical hernia. I only detected 1 case of inguinal hernia. Why does umbilical hernia take place with such frequency? Most of the poor women in Smith's Village are confined by a dirty midwife and the umbilicus is kept in a far from clean condition, and there is no doubt that this dirty condition of things produces a weak scar, which yields readily later on. Many of the children have distended abdomens, and this also tends to produce this form of hernia. The causes generally producing this type of hernia do not obtain here. For instance, it is uncommon for a child to cough in Jamaica; again, these children are not troubled with constipation. We can thus exclude two of the chief causes of umbilical hernia, and as the children are remarkably happy and quiet and do not cry very much, we can do away with the last and most important cause—increased pressure.

The deformities which are common to the white child are very rarely found in the colored child of the Island. I did not meet with one case of talipes, scoliosis, or of spinal deformity due to caries. I must say that the newborn colored children are pictures of health; their limbs are firm and well rounded. Many of the black children come into the world looking nearly as white as a dark-complexioned white child. Many, who are only partially black, appear perfectly white at birth, but, as a rule, the helix of the ear is slightly colored and the genitals of both male and female always are pigmented. I had a good opportunity to note this as I examined 25 newborn children in the Jubilee Hospital, and I have to thank the Hon. J. Errington Ker, S.M.O., of Jamaica, for giving me *carte blanche* to make use of the material in the above institution. As the children grow older they become darker and darker until they reach the color that nature intended, depending upon the color of the father and mother. Many of them are quite black at birth. The colored woman makes a good mother in many ways; if it be possible she will nurse her child, and it does not matter how many children she may have, or how many different fathers they may possess, she will work hard and do her best to support them. She realizes the fact that she has a duty to perform toward her children.

As a rule, the colored child is a healthy child, and it is not an uncommon sight to see a little girl of twelve years walk down from the hills into Kingston market carrying on her head a basket containing oranges, yam, bread fruit, and other produce weighing 30 to 35 pounds. The distance into Kingston may be nine miles, but she will walk merrily back in the evening the same distance. The mountain children are healthy, and as they carry practically everything on their heads they have a fine erect carriage and well developed chests.

The infants and young children are not prone to develop tuberculosis; however, it is common in boys and girls after the age of fifteen; no doubt it is often contracted through direct contagion and want of fresh air, as they close their little houses of two rooms at night so as not to admit fresh air.

Jamaica is essentially a black child's country; this child will thrive and do well in its native air, but I cannot say the same for the white child. As a rule, the white child is pale; his appetite is poor, and he requires a frequent change of air to keep him in condition. He not only suffers from the ills peculiar to this hot climate, such as malaria, debility, etc., but he has to battle, also, against the diseases which worry the child living in a colder climate, as typhoid fever, bronchitis, adenoids and tonsils, rickets, etc. Many of these little children suffer from malaria, and it leaves them in a miserable condition, with very tedious convalescence. If they pass six years of age they may be fairly robust. I certainly think that a white father should not allow his child to remain on the Island for a longer stretch than nine months at a time. The child should have frequent trips to England, Canada, or to some cool climate, if he can afford it. Of course, there are some children who will thrive anywhere, but my remarks apply to the average white child. Many of the children do go home every year for a trip, and they keep in pretty good condition.

Some months ago I read with great interest an article published in the ARCHIVES OF PEDIATRICS, June, 1907, by Dr. Joseph Brenneman, of Chicago, entitled: "The Sacral or So-called Mongolian Pigment Spots of Earliest Infancy and Childhood, With Especial Reference to their Occurrence in the American Negro." I thought, as I had the opportunity, that I would examine for the spots in the West Indian child. Out of the 217 children examined 89 were pure black, 48 three-quarters black, 57 were Sambo, and the remaining 23 were light. I found that 44 children had Mongolian spots. As to the color of these, 8 were pure black, 18 three-quarters black, 15 were Sambo and 3 were light children. Twenty-five of the children were less than ten days old, and among this number I found that twenty of them, or 80 per cent., had the spots. Twenty-eight children under one month old were examined, and out of this number there were twenty-two who had Mongolian spots. Forty were six months and under, and this group presented 27 with the spots. Fifty children were one year and under, and 33 of them had Mongolian spots.

In children of one to two years there were 40 out of 83 who had the spots. I only found 4 children with Mongolian spots who were over two years of age, one of these being a child of five.

It will be seen in this list that we get Mongolian spots in 80 per cent. of colored children who are under ten days old; the percentage does not change to any extent in the children who reach one month. As they advance in age, however, the percentage of spots gradually lessens. We only find 27 children out of 40 at six months old who have the spots. The percentage is practically the same up to the first year, but in children of one to two years I only found 40 out of 83 who had them, a little under 50 per cent. It is a rare event to find them in children over two years of age—only two were in this group.

From the above figures it will be seen that most of the new-born colored children have those spots, and as the children advance in age they progressively become less and less common. It will be found that the degree of color of the child influences the presence or absence of the spots. As will be seen by the above list, 89 of the children were quite black, and in them I only found 8 with Mongolian spots. On the other hand, 18 out of 48 three-quarters black children had them well marked. Fifteen out of 57 Sambo children presented them, but only 3 out of 23 light children had them. So if the child is too dark or too light they are not often present. I examined many children who were nearly white in appearance but who had black parents, and in these cases it was rare to find the spots, though I am inclined to think that they would show up when the child reached the age of one or two months.

The spots were found on different parts of the body. I detected them most frequently on the lower part of the sacrum; next in frequency they were found in the gluteal region, 10 being bilateral. They are seen at times covering a large portion of the back; are also found on the shoulder, thigh, hip, lower leg, etc. In 1 child I found but 1 spot about the size of a five-cent piece; in others they reach the size of the hand. One of the children presented a peculiar condition of the back—there were large spots on the lower portion of the spine, but higher up I found a mottling like so many pieces of shot. I found spots in one set of twins.

As to the color of the Mongolian spots, in the densely black child they have a bluish appearance; in the Sambo children usually bluish, dark or light in shade; in many I found a greenish hue. I found the spots fading in some of the children. The observant mothers have noticed them and some think they are birth marks, others that their presence is due to the fact that when pregnant they wished for food they could not obtain; this was generally the liver of some animal. One good woman told me that she had eight children, all of whom had the Mongolian spots, but that they wore off as the children became older. I am convinced that the spots became darker in color until the child reaches the age of three months; they remain stationary for some time and then gradually fade away.

THE NEED OF POST-GRADUATE INSTRUCTION IN PEDIATRICS.*

BY AUGUSTUS CAILLÉ, M.D.,
New York.

In the making of a medical practitioner there is still a lack of system and uniformity, which is difficult to explain, except as we view it as one of the forms of inherited or transmitted human inertia noticeable along sanitary lines in general.

At the present time the best results are probably obtained where a student, endowed with good "preliminaries," enters a medical school which is part and parcel of a large university so located as to be able to offer to the senior student in medicine ample hospital facilities and abundant clinical material; with its curriculum so arranged that the undergraduate's time is not taken up by didactic lectures, and the student is early brought into contact with the evidence of nature's manifestations in health and disease by means of practical courses in chemical, physiological and pathological laboratories.

Small medical colleges can, no doubt, also turn out good practitioners on account of the greater care given to each student, but to accomplish this they must offer a system of "object lesson teaching," by means of which, as Agassiz tersely says, "One may study nature, not books."

Faulty as it is, we must confess that the wholesome impetus of a good medical school makes the student eager for the two years' hospital and bedside training which is to follow, and at the end of which he is fairly well equipped to be let loose upon the public as a general practitioner.

In the realm of pediatrics, however, the young physician, as he starts out upon his life of service, is deplorably ignorant. He may be able successfully to cope with difficulties in diagnosis and to formulate indications for treatment, and even carry out proper treatment in the adult, but when he is confronted with the problems presenting themselves as regards the hygienic, dietetic and specific management of the ailing child, he stands, as far as practical knowledge goes, *"vis à vis de rien,"* and is unable to stake and prove his claim in pediatrics unless he has had the very exceptional good fortune to have spent half a year in a hospital devoted to diseases in children.

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* Read before the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 25, 1908.

During a twenty years' service as teacher in pediatrics, the writer has not met a single young hospital graduate other than ex-internes of a children's hospital, who, on inquiry, did not freely admit his lack of practical knowledge regarding a line of professional work which makes up one-half the practice of the family physician. It is evident, therefore, that the present facilities for acquiring the knowledge necessary to combat preventable infantile sickness and mortality are totally inadequate and that more practical instruction along the lines indicated is urgently needed.

How best to meet the demand for practical post-graduate instruction in pediatrics has taxed the efforts of those devoted to this kind of work.

The value of a good post-graduate course lies in the fact that under guidance of competent teachers one may first see a patient in the *"dispensary,"* then in the *hospital ward,* where medical, operative or specialistic treatment is carried out in detail. One may examine the patient, study his "chart," examine blood, sputum, excreta, puncture fluids in the *laboratory,* and, if the patient dies, one may witness the autopsy and examine the specimens obtained.

Dispensary Clinics.—A large ambulatory service is the *sine qua non* feature of a good medical school. Dispensary work (apart from its value to the community) is excellent discipline for acquiring the art of making more or less accurate diagnoses and sharpening the power of observation.

Hospital Wards in Connection with the Clinical Laboratory.—The "wards" in connection with a clinical laboratory afford every facility for accurate study and proper treatment of patients. The course and termination of disease may be watched, and it is frequently possible to "prove the case" by transillumination, surgical procedure, or autopsy. The "wards" are available for illustrating and demonstrating methods of prophylaxis (ventilation, isolation, disinfection and protective inoculation), for diet kitchen work, palatable medication, for surgical, orthopedic and other manipulative or electrical therapy and for teaching physical diagnosis and diagnostic punctures.

Bedside Instruction.—Making rounds with a *large class of students* is of little value. To make bedside observation available for large classes, any one of the class should be allowed to visit the wards and examine patients and study their records during a set time of two or three hours daily and at a time in which there will be no serious interference with other clinics or other work. For purposes of bedside instruction the writer makes use of a diagnosis chart which was presented to this Society on a former occasion, which assists a student to go through a routine examination of any case assigned to him.

Amphitheatre clinics have their advantages and drawbacks. To utilize clinical material to the best possible advantage requires a large floor space for setting up ten to twelve tables for the simultaneous examination of as many patients. Demonstrable regionary lesions can be marked in colors on the skin of a patient or may be recorded by means of a chart. Not more than four matriculates should be invited to each table and, guided by competent instructors, should be given an opportunity to examine each case. After such demonstration *en masse* the students would take their seats and the teachers would proceed to point out the important differential diagnositc features and therapeutic indications in each case. Diagnostic punctures and manual methods of treatment, such as stomach and bowel irrigation, bathing, feeding by gavage, tapping the thorax, the abdomen, the spinal canal, intubation, removal of adenoids and tonsils, etc., can be demonstrated with advantage before a large class. The Lumiere color photograph is also available for clinical teaching.

The broadening influence of pediatric study has not been sufficiently emphasized and is probably underrated, but must be conceded as we realize how thoroughly the practice in diseases of children brings us into close touch with almost every other special line of medical work, including general surgery, the eye, ear, nose and throat specialties, orthopedics, skin diseases, etc.

Owing to the lack of flexibility in medical matters, much time will pass before medical schools will be properly equipped to teach practical pediatrics, but it is so ordained that all evils will in time work their own cure, and these few reflections are offered as a small contribution to the propaganda of adjustment.

RECURRING EMPYEMA.*

BY FRANCIS HUBER, M.D.,

New York.

Recurring pleural empyema, according to Dr. J. H. Pryor, is a term "employed to describe a renewed involvement of the previously affected pleura, occurring at an indefinite time after recovery from the primary attack." In his comments upon the case reported (*New York Medical Journal,* December 21, 1907, page 1,165), Pryor says: "The fact that empyema may recur years after recovery has not received the attention it deserves. It seems to be a very rare affection."

Dr. Park, in a careful search of the surgical literature, found no mention of the subject in the text-books. He found the report of a case by Ayer and another eight years after recovery reported by West. It is claimed that secondary attacks are apt to assume the sacculated or localized form, because of the pathological changes following a preceding severe involvement of a large part of the pleura.

The symptoms may be obscure in some instances, as in the case reported by Pryor. In others, the bulging at the site of the original wound or the physical signs will direct attention at once to the nature of the trouble.

In the above-mentioned article, Pryor, in commenting upon the apparent rarity of the condition, says probably the report of 1 case will lead to the remembrance or discovery of others.

Roswell Park, in the same vein, writes: "Regarding the rarity of this condition, I cannot believe that it is so uncommon as a search through the *Index Medicus* would indicate. I believe there must be cases of this kind on record, which are not revealed as such by the title under which they have been published; nevertheless, the fact remains that several pages of both series of the *Index Medicus,* when carefully searched, failed to show more than two such titles."

In discussing the cases, Park speaks of the interesting and unusual features; and, regarding its pathology, is inclined to regard it as an instance parallel to what one may see in the bones, as far as septic and suppurative disease is concerned. He recalls the fact that bone abscesses subside and remain latent for a long time, even as long as twenty years, and then are excited into activity, and develop, as it were, afresh.

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* Read by title at the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 26, 1908.

As to the cause of recurrent attacks, Pryor offers as a conjecture that microbe life remained latent in a pocket formed in the process of healing, and became active under unknown favorable conditions.

The report of Pryor's case has led me to look over my notes. In the cases which have come under my own observation, there was little or no difficulty in making the diagnosis and instituting the proper treatment.

The usual signs of an effusion were present, and in addition there was a more or less distinct bulging at the side of the original incision.

Barney R., about four and one-half years old, was operated upon for pyopneumothorax about seven years ago. In this case a pleural fistula, which appeared to have healed, undoubtedly gave rise to the recurrences which took place after two years and after eighteen months respectively. Recently, after an apparent recovery extending over two years, a slight elevation of temperature, pain in the old cicatrix. followed by a purulent discharge, points to a recurrence. He is still under observation.

Perry C., about three years old, operated upon and discharged cured, returned to the hospital about two and one-half years later, with a sinus which had appeared a short time previously. Several operations were done subsequently. Patient passed from under observation and ultimate result not known.

Rosie A., two years old, entered the hospital February 6, 1906. She had been ill for ten days. February 12th the affected side was incised and drained; the subsequent course was favorable. The patient discharged April 1st with wound healed, pulmonary expansion excellent. December 23d was again admitted with a return, about ten days previously, of her old troubles. At the site of the original incision a small abscess appeared, which was opened, allowing 3½ ounces of pus to escape. Two ribs united with a bony bridge were removed; the cavity packed with sterile gauze. Further progress uneventful. Patient discharged January 30, 1907, in excellent condition.

Male, two and one-half years. Rib resected October 9, 1906. Recovery in about six weeks. Nothing abnormal until February 21, 1907, when rather suddenly a bulging appeared at the site of the former operation. Full recovery after another operation.

A girl, operated upon when about three years old, and who, when discharged, several months later, appeared to have fully recovered, presented herself as an office patient when about fourteen years old, with a purulent pleural effusion; and marked bulging at the site of the old scar. The subsequent course is unknown, as patient simply came for an opinion.

Finally the case of Bennie A. is cited. Bennie A., twenty-one months old, admitted November 7, 1907, with this history: Five months before, he had been operated upon in another hospital. He appeared to have recovered in about two months. Three months later he was admitted in a very bad condition, with the left chest full of pus. He was first aspirated because of his precarious state, and three days later a thoracotomy was done.

In explanation of such recurring attacks, the writer cannot add anything new to the remarks, or comments, of Park and Pryor. It is often a difficult question to decide when to remove the drain after an operation for empyema. If taken out too early, a little pocket may remain in a quiescent state, the superficial stricture healing nicely. We can readily conceive that as long as the general health remains good no symptoms may arise and no disturbances follow, until some accident or lowered resistance causes the old process to light up. In this manner we may readily explain the recurrences within two or three months, or after apparent cure. In other instances, in addition to the thickening of the pleura, there are abundant adhesions and pockets; while the greater part of the cavity may be obliterated and become innocuous, small foci may subsequently, at longer or shorter intervals, cause a lighting up of the original process and thus lead to a so-called recurrence.

HEMATURIA IN INFANTS.—Parkinson (*British Journal of Children's Diseases,* February, 1907) reports a case of infantile scurvy in which hematuria was the only obvious sign of the disease, although on closer examination other signs were discovered. In another case, a congenital renal tumor caused hematuria, while, in a third, hematuria followed scarlet fever. In the latter case Parkinson found dry cupping over each kidney of great value in checking the hemorrhage.—*Journal of American Medical Association.*

FATAL HEMOPTYSIS IN CHILDREN. REPORT OF A CASE.

BY W. EDWARD MAGRUDER, M.D.,

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That fatal hemoptysis occurs rarely in childhood is borne out by the statement of Rilliet and Barthez, who claim not to have observed it in children under six. Holt states that he never met with a case in a child under five.

West (*Diseases of Children,* fourth American edition, 1866) reports having seen 6 children who had died from hemorrhage which appeared to have been from the lung, but in 4 no examination was made after death. Of the 2 upon whom autopsies were held, the source of hemorrhage could not be determined, as no large vessel was found to be ruptured.

Carrie reports a case in an infant of two and Lebert also saw fatal hemorrhage in a child of the same age.

Henoch (*Lectures on Diseases of Children,* New Sydenham Society, Vol. I., 1889) mentions having seen a girl of ten months, who had emaciated considerably after measles complicated with pneumonia, recover from a slight hemorrhage and die later from a larger one. Autopsy on this case showed left lung to be adherent to costal pleura. "In the middle of the upper lobe, which was much consolidated, and partly caseous, there was a cavity about the size of a walnut, which communicated with a bronchus, and contained a tumor ($\frac{3}{5}$ of an inch in diameter). This proved to be a thin-walled aneurism filled with thrombi and connected with a branch of the pulmonary artery." He refers to Hofnung's dissertation, which included a report of this case.

Wyss (*Gerhardt's Handbuch,* Vol. III., pt. 2, S. 807) speaks of a fatal case seen by Ferner in a child of six, in which the cavity communicated with the pulmonary artery.

Goodhart reports having seen fatal hemoptysis in a child four and one-half years old from aneurism of a branch of the pulmonary artery in the wall of a cavity.

Herz, according to Holt, "in 247 clinical cases of tuberculosis in children, records 8 of hemoptysis, 4 of them under five years, and the youngest only eighteen months. The records of 131 autopsies on tuberculous children in the Pendlebury Hospital show that hemoptysis was four times a cause of death; 2 of these patients were under five years and 1 was but twelve months old."

The most comprehensive article on the subject appears to be the "Thèse of Paris," in 1892, by Meusnier. He reviews 33 cases from various sources, including those of Henoch and West above mentioned, and others, which were not positively known to have been exclusively pulmonary (as in purpura and syphilis), and of the 33 only 17 were under the sixth year. He had evidently looked up the subject carefully, as his references to the literature are very complete.

The writer has been able to find 4 cases as follows:—

Cane (*British Medical Journal,* Vol. I., 1904) reports a case of hemoptysis in a girl three and one-half years old, who had been suffering with a cough for nine months, which had grown worse since an attack of the measles. She died from profuse hemorrhage. Necropsy showed a clean, punched-out hole on the posterior wall of the trachea, which communicated with an abscess cavity formed by a necrotic gland the size of a small nut. In the upper lobe of the left lung there was a cavity the size of a pigeon's egg containing blood clot. The spleen was full of tuberculous nodules, and a few scattered tubercles were seen in the liver.

Acker (ARCHIVES OF PEDIATRICS, 1898) reports a fatal case of hemoptysis in a colored boy eighteen months old. The child was emaciated and anemic, and had a cough. Pulmonary symptoms were present and grew very marked. He died suddenly from profuse arterial hemorrhage from the lungs. Necropsy showed numerous areas of tuberculous caseation, split pea in size and larger, scattered through substance of both lungs. Ulceration found on posterior wall of trachea 7 x 4 mm. in size, extending through thickness of bronchial wall communicating with a pulmonary vein.

Acker (ARCHIVES OF PEDIATRICS, 1898). A fatal case of hemoptysis in a colored boy aged three years. The child had a cough, with fever every night, loss of appetite, vomiting frequently after meals. Died immediately after expectorating a quantity of blood. Necropsy showed both lungs congested and studded with miliary tubercles. Edema of right lower lobe. Spleen enlarged and studded with minute tubercles. No ulceration.

Powell (*London Medical Times and Gazette,* Vol. I., 1874). A case of hemoptysis in an infant seven months old. The child was suffering from a spasmodic cough with expectoration and had a history of pulmonary symptoms for three months. Died suddenly, bringing up blood in large quantities. Right lung was extremely diseased. At summit of left lower lobe were two cavities as large as a filbert, and in one of these a vessel was exposed, which at one point was ruptured. Miliary tubercles throughout the lungs.

A case of hemoptysis in a child sixteen days old is reported in the *Dict. de Med. et de Chir.,* Vol. XXIX.

The following fatal case came under our observation:—

Negro boy, age three, was admitted to City Hospital May 9, 1905, and died from pulmonary hemorrhage on forty-fourth day.

Family and previous history were unknown at orphan asylum from which the case was sent, and present illness had begun two weeks prior to admission, but had not seemed more than a bronchitis.

Examination revealed consolidated areas at upper part of left lung, tubular breathing, fine crepitations over left side, front and back, and friction rub over base.

Percussion note over sternum was dull and suggested glandular enlargement, and glands in abdomen and neck could be plainly felt. Liver was much enlarged. Spleen could not be felt. The child was emaciated and was suffering greatly from dyspnea. The nurse succeeded in wiping some sputum from his mouth after a spell of coughing, but tubercle bacilli were not found.

Temperature on admission was 102° F. and ranged between 101° F. and 104° F. throughout, except on the twenty-ninth day, when it became subnormal and the child appeared to be in collapse, but recovered after active stimulation.

No special examination was made of the stools at this time for evidence of blood, and a small pulmonary hemorrhage may have taken place.

Progress of the disease continued to be rapid until the forty-fourth day, when death followed profuse hemorrhage, during which blood poured from mouth and nose.

Through the efforts of Dr. Fiske, of the resident staff, permission to perform an autopsy was obtained, and the following notes were made:—

There was general glandular enlargement. The left lung was consolidated at apex with emphysematous areas throughout and was completely studded with tuberculous nodules. The right lung showed pleuritic adhesions and fluid was present in considerable quantity. In the upper lobe was found a cavity (3½x2½x1½ cm.) into which a branch of the pulmonary artery had ruptured, causing hemorrhage and death. Stomach contained large amount of blood. Liver was fatty and showed miliary tubercles in abundance. All organs were full of tuberculous nodules, as likewise were the peritoneum and mesentery.

Meusnier divides hemoptysis into two varieties, direct and indirect. He describes the direct as being due to ulceration and cavity formation in the lung itself, with either rupture of an aneurism into the cavity or of ulceration through the wall of a blood vessel. The indirect form of hemoptysis is caused by the breaking down of tracheobronchial glands which are adjacent to blood vessels and in close proximity to a bronchial tube through which they rupture. Sex seems to have some influence, for, in the cases reported, males predominate.

The infrequency of hemoptysis in tuberculous children is probably, in great measure, due to the fact that they are overwhelmed by the effects of the disease in other organs and glands, before the process in the lung has become distinctly localized and the pulmonary tissue destroyed.

922 Madison Avenue.

CONGENITAL LUMBAR HERNIA.—Dowd (*Annals of Surgery,* February, 1907) reports a case of this kind which was first noted when the patient was three and one-half years old. The hernia was about the size of a goose egg and bulged in a marked way on coughing or on exertion. The triangle of Petit was greatly enlarged. The sac of the hernia was distinct. Its contents consisted of colon and appendix. There was no recurrence of the hernia after eight months.—*Journal of American Medical Association.*

SPORADIC CRETINISM (TYPE FRUSTE).—REPORT OF A CASE.*

BY DR. CHARLES F. JUDSON,

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AND

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The recognition of cretinism is not difficult in typical cases. Where the disease manifests itself in incomplete form—the *type fruste* of the French classification—it presents a clinical picture which is not easy to interpret, and raises questions as to diagnosis and prognosis the correct solution of which is of great import to the child's future.

The history of the case is as follows:—

Marie H., white, the sixth child, was born June 3, 1905. Pregnancy was uneventful, birth normal. Etiological importance must be attached to the presence of a simple goiter in the mother, which had been present twelve years. No symptoms of Graves' disease had ever appeared. The other five children were healthy and normal in size and development, mental and physical. Neither of the parents suffered from tuberculosis, syphilis or alcoholism. The child had been fed on a weak mixture of cream and barley-water (low proteids and low fat content) during the greater part of her first year, and had gained weight very slowly. She then had received a mixed diet. Her first teeth appeared at the end of the first year. She had always been very constipated. Had had no infectious diseases or acute gastric or enteric disorders. She was brought for treatment because she was backward. She could not stand, or crawl, or turn over in bed unassisted. At the time of her first visit she suffered from a severe mucopurulent rhinitis (not diphtheritic) and a mild bronchitis. She presented the following appearance February 3, 1908:—

The expression was dull, suggesting idiocy. The head of medium size, the neck very short with the head squatting on the shoulders, the limbs short, the abdomen very large with a small umbilical hernia, the muscles poorly developed and flabby, the joints abnormally mobile, the skin dry and rough, the hair scanty, dry and lustreless, the genitalia underdeveloped. Pallor was marked, excepting bright-red eczematous patches on both cheeks, following rhinitis. The extremities were cold and cyanosed, the cry was hoarse and inarticulate. The vertex was flat, the anterior fontanel wide open, measuring one inch by three-quarters, the edges of the lambdoid suture yielded to pressure, the forehead was low and wrinkled, the bridge of the nose low, the palpebral fissure narrow, the eyebrows faintly marked, the malar eminences rather high, giving the face a broad appearance. The mouth was closed, the corners drooping and extended widely in an ugly grimace when the child cried. Dentition was delayed, only twelve teeth being present; no caries. The tongue did not protrude, was not distinctly swollen or hypertrophied, there was no drooling saliva. The palate showed a high arch. The ears projected somewhat; the lower lobe was large. The thyroid gland could not be felt. A small mass was palpable above the left clavicle, resembling a myxedematous deposit.

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* Read before the Philadelphia Pediatric Society, March 10, 1908.

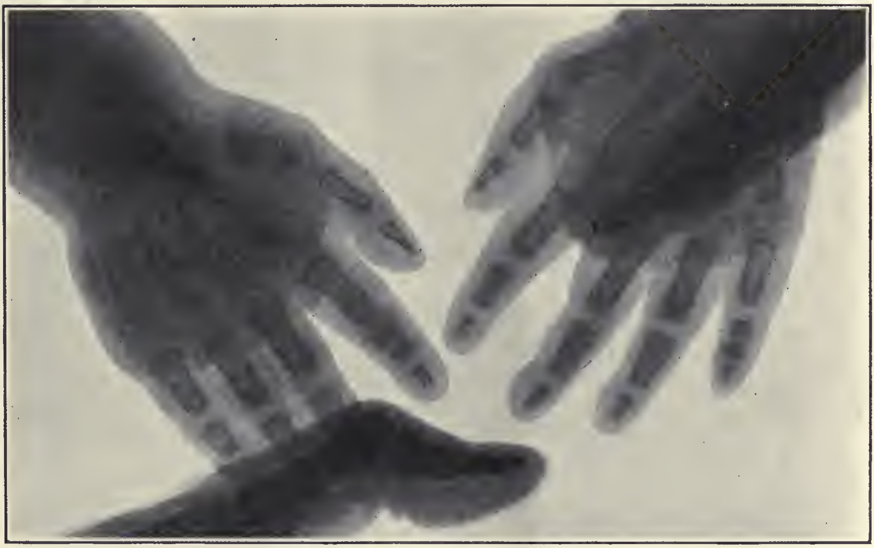
The shape of the thorax was normal, the costal angle broad; there was no rosary. No evidence of cardiac disease was present. There were no rachitic changes in the spine or the long bones; the bones were small and showed no bowing or epiphyseal enlargement. There was no evidence of myxedematous deposit; the subcutaneous fat was rather scantily present. The tips of the fingers reached just below the great trochanter with the arms fully extended. The head was relatively large; its circumference measured 44 cm., the chest 41 cm. at the level of the nipple. The length of the body was 64 cm., the normal for this age being 85 cm. The weight was 15 pounds, 4 ounces, the normal being 32 pounds. The length of the arm (acromion process to wrist) was 20 cm., the length of the leg (trochanter to external malleolus) 25 cm. The anteroposterior diameter of the head was 15 cm., the lateral diameter 13 cm.

The blood count, made by Dr. Jenks, gave the number of red cells present as 3,300,000, the number of white corpuscles 8,000, and the hemoglobin 60 per cent.

Most striking and characteristic was the lack of mental development in this case, with little recognition of persons and objects. She showed little affection, could not feed herself, cried constantly with bad temper, and did not play with her toys. Speech was limited to one word, "mamma," and that was articulated indistinctly.

The temperature was not subnormal, measuring 99° in rectum on two occasions. The pulse ranged from 110 to 120, and the respiratory ratio from 36 up to 80 per minute. There were periods of several hours' duration when the respirations were noisy and continued at a very rapid rate—80 to 90 per minute. There was only a mild bronchitis. The superficial lymph glands were not generally hypertrophied.

A radiogram was taken at the Pennsylvania Hospital through the kindness of Dr. Jenks. The picture shows the defective bone-development characteristic of sporadic cretinism. The centers of ossification for the small bones of the carpus are only partially formed (in one hand two centers are visible, in the other only one), and the epiphyses of the radius, metacarpal bones and phalanges, which are present at this age in the normal as well as the rachitic child, are not visible. The X-ray picture enabled us to diagnose our case as one of the *type fruste* of sporadic cretinism, or it might, perhaps, be better called infantilism from thyroid insufficiency.



Hands of child two years old with sporadic cretinism. Note the absence of the epiphyses.

The improvement, under treatment with small doses of thyroid extract, was remarkable. The child's disposition became cheerful, she rapidly learned to repeat words addressed to her, to recognize the persons about her and to ask for what she desired. She began to feed herself, smiled often and grew quite affectionate. The hair became soft and silky, the skin smooth, and the muscular tone improved so that she could turn over in bed and crawl about.

The constipation, which had been obstinate, yielded to thyroid treatment, and there was a marked diminution in the size of the abdomen. The rhinitis and eczema disappeared quickly.

Early recognition and prompt treatment of these cases is essential. The condition with which they may be confounded are rachitis, chondrodystrophy and Mongolian idiocy. The superficial resemblance of our case to ordinary rickets was marked. It was distinguished from rickets by the absence of rachitic changes in the thorax or the long bones and in their epiphyses, the dwarfing of the extremities in proportion to the trunk, and the defective ossification shown by the radiogram.

Achondroplasia is characterized by voluminous epiphyses with exaggerated prominence and angulation of the long bones, large head and normal trunk, with marked shortening of the extremities, especially of the femur and humerus, but there is no lack of intelligence. The short, stumpy fingers, with trident-like separation, is also characteristic.

Mongolian idiocy differs from this case with its typical facies, slit-like, slanting eyes, the presence of the epicanthus fold. In the hand, the X-ray picture shows the normal number of epiphyses present, with premature ossification of the diaphyses, and normal number of carpal bones.

Infantilism, of the type described by Lorain, is undoubtedly present in the case reported. The cause of this condition must be sought in the absence or insufficiency of secretion of the thyroid gland, although the low caloric value of the milk mixture given during the first year of life may have been a contributing factor in the slow development of the body at that time.

A PLEA FOR A SQUARE DEAL FOR THE WET NURSE.—Watson (*Journal of American Medical Association,* December 8, 1906) attacks the system of giving out foundling infants to be wet-nursed, relating the dangers following such practice. Wherever such system is in vogue there chancres of the breast abound. Some years ago Bulkley collected 1,148 cases of chancre of the breast. He says regarding them: Italy takes the lead, furnishing 33 per cent. of the cases. Russia, Poland and France also give large numbers, in all of which countries baby farming is very prevalent. The system should be done away with, as our modern methods of raising infants show great success.—*New York Medical Journal.*

Clinical Memoranda.

A CASE OF ERYSIPELAS TREATED BY STREPTOCOCCUS VACCINE.

BY J. HARVEY BORDEN, M.D.,
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This case of erysipelas is of interest because of the age of the subject, and also because of the apparent success of treatment with streptococcus vaccine.

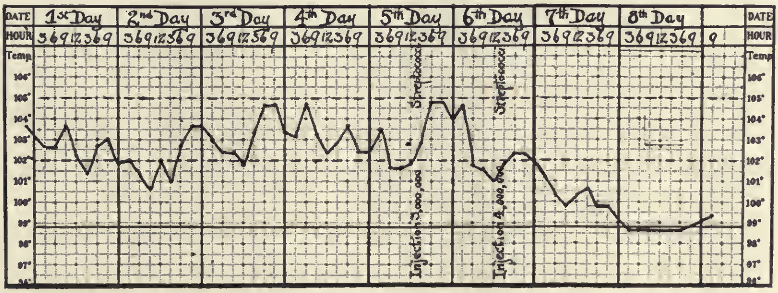
The mother of the patient was a healthy woman in good circumstances, thirty-two years old, who was delivered on March 1, 1908, of the patient, a well-developed girl-baby weighing, at birth, 8 pounds, 2 ounces. The father, one week before, had visited a friend who was convalescing from an attack of erysipelas. The child, breast-fed, gained rapidly after the usual initial loss, and on March 22d weighed 9 pounds, 14 ounces. On March 23d or 24th the baby received from an unknown source a slight scratch near the tip of the nose, which healed rapidly and was so insignificant that no attention whatever was given to it by the nurse.

In the afternoon of March 26th the baby became ill suddenly, with a temperature of 101.4°, a distended, tender and tympanitic abdomen. At that time the bowels had not moved for thirty-six hours. At 8:30 P.M. the fever had risen to 103.6°. The feeding was discontinued and castor oil administered. Irrigation of the colon brought away much flatus and foul, partially digested food residue. A stained blood smear showed a high leukocytosis and polynucleosis. The temperature continued high until morning, and on March 27th, at 9:30 A.M., the baby had a severe chill and a convulsion, which was repeated at 6 P.M., when, for the first time, it was noticed that the nose about the scratch above mentioned was red and indurated. The patient at this time was in a condition of nervous hypersensitiveness with vasomotor instability, exaggerated reflexes, spasticity of the lower extremities and rigid, somewhat retracted neck. There was moderate diarrhea, with offensive and undigested movements. The child appeared extremely ill.

From this time on the brawny swelling of the nose spread rapidly until, twenty-four hours after it was first noticed, it involved the entire nose, the upper lip and both cheeks half way to the ear. Then it extended, presenting a typical elevated and serrated border, to the forehead, and thence over the entire scalp; to the loose tissue of the neck, which became intensely injected and brawny; spread over the chest to the nipples; involved the skin over the deltoids, and reached the level of the shoulders behind. On March 31st, the fifth day from onset, the eyes were completely closed and could not be opened; there were numerous blebs at the site of infection and over the forehead and cheeks, and the copper-hued face and head appeared as large as in a child of three. The baby's weight at this time was 10 pounds, 6 ounces, just 8 ounces more than it weighed on March 22d, before the onset, or on April 3d, after recovery.

Throughout the course of the disease the baby nursed every two hours, retaining nourishment well and only vomiting occasionally. It received, in addition to the breast feedings, brandy and panopepton āā ♏x, well diluted, at two-hour intervals. This was the sole internal medication. The colon was irrigated twice daily with hot saline till the return flowed clear. Morning and night a hot bath was given, after which the ointment in use was applied. The air of the sick room was kept constantly pure. The local applications employed were ichthyol, 25 per cent., and 40 per cent. strength in lanolin; this ointment, with 10 per cent. iodin in addition; tincture of iodin and a 50 per cent. solution of silver nitrate. The ichthyol-iodin ointment, which was applied only once, and the 50 per cent. silver nitrate appeared to control, to some extent, the advance of the disease. Plain ichthyol ointment, even in 40 per cent. strength, and tincture of iodin were certainly without effect.

On the third day of illness cultures were taken on agar from the advancing border. They were sent to the Cornell laboratory for incubation and preparation of a vaccine, but no growth resulted. However, Dr. T. W. Hastings returned a vaccine prepared by him two days before from a case of erysipelas then in Bellevue Hospital. On March 31st, 116 hours from the onset, while the temperature was 103°, and the application of silver nitrate and of icthyol iodin ointment had apparently limited the advance on the chest, 3,000,000 dead streptococci were injected into the muscles of the thigh. Three hours later the temperature was 104.9° and the heart beat about 240 to the minute, distinct and regular. The prostration of the patient had increased. Twenty hours after injection the temperature was lower than at any time for three days previous and the face had entirely cleared up. A second injection of 4,000,000 streptococci was given. This was followed by a slight rise and a later drop to normal within thirty-six hours. The patient passed the first normal bowel movement since the inception of the disease, all swelling, edema, and induration, except for a small area in the neck, disappeared. The further course to complete recovery was uneventful.



Temperature chart—Case of erysipelas treated by streptococcus vaccine.

The writer recognizes the difficulty of estimating in an individual case the efficacy of a particular method of treatment. He personally feels that here the administration of streptococcus vaccine exerted a markedly beneficial influence.

Mycosis Fungoides.—McVey (*Journal of Kansas Medical Society*, March, 1907) reports a case of this kind occurring in an infant. The tumors were situated on the left eye and left cheek. On other portions of the body there were circumscribed erythematous patches. The father of the child had had such an eruption over his body when he was an infant, but after his development into manhood the disease disappeared and did not return. The child was given the syrup of the iodid of iron, 5 drops, three times a day, and the oleate of bismuth was applied locally. The Finsen light was also used for fifteen minutes each day. The child died three months after coming under observation. —*Journal of American Medical Association.*

INTUSSUSCEPTION.—OPERATION.—RECOVERY.

BY LEGRAND KERR, M.D.,

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The typical clinical picture of an intussusception is that of a sudden and acute onset of abdominal pain in an infant who has been previously healthy, accompanied by vomiting of a persistent character, great prostration and an obstinate constipation. And such is the symptomatology which many expect to find before they are willing to make a positive diagnosis of this dangerous condition of the bowel. The case which is here reported, besides having some unusual features, well illustrates the disadvantage and danger of tying up to a text-book description of this abdominal calamity, without the application of personal judgment and reasoning to each individual case.

S. H., a male infant nine months old, had always enjoyed excellent health up to November 9 (Saturday), 1907, when he became restless and fretted most of the night, passing several green stools. On Sunday morning he was less restless and the stools had a more natural appearance, but projectile vomiting occurred. The vomited material was reported to consist of food particles, much mucus and some bile. The temperature was normal and the diagnosis was flatulent colic.

From Sunday morning at six until midnight the infant passed two stools, both of which were green, contained an abundance of mucus and were passed with straining. The vomiting continued and the infant was unable to retain either medicine or nourishment (breast milk). On Monday afternoon the infant passed a stool which contained some blood, and began to give undoubted evidence of great pain. During Monday night there were two stools consisting entirely of blood-stained mucus, and these two, like the previous ones, were evacuated with marked straining. The diagnosis was then made of ileocolitis and vigorous treatment instituted. On Tuesday the condition remained about the same—the vomiting persisted, the prostration became more marked, and the infant passed four bloody, mucous stools and one which was entirely black. (Bismuth had been used, but whether the black stool was due to its change in the bowel I have not been able to demonstrate.) On this day the colicky pain increased in degree and occurred at shorter intervals than before, so that it was almost continuous. On Wednesday morning the diagnosis of meningitis was made from the semicomatose condition and the fact that the infant, when aroused with difficulty, rebelled against the disturbance, from the persistent vomiting and from the occasional sharp cry of pain made. During the day the infant passed three stools consisting of blood and mucus, and these were passed without much straining. I first saw the case, in consultation, on Wednesday night at nine. At that time the infant was in a state of collapse, almost pulseless, with cold extremities and with a rectal temperature of 99.1° F. The anxious expression was intensified by the very pale face. Respirations were shallow and rapid. The abdomen was not tympanitic, but showed a considerable retraction upon the right side. Manipulation was resisted, and the whole abdomen seemed sensitive to the slightest pressure. While being examined the infant evacuated one bloody stool (about a dram) and without any straining. A tumor was felt upon the left side of the abdomen, round, long and very sensitive. An examination by the rectum failed to reveal anything until gentle downward pressure was made by the free hand over the tumor and then the obstruction was plainly felt. When the finger was withdrawn it was coated with bloody mucus. An immediate operation was advised and consented to.

For the data in regard to the operation, I am indebted to Dr. Wm. Chapman, whose skillful operation saved the life of the infant.

When the infant was placed upon the table the pulse was 160 and the abdomen was very rigid. A rectal examination at this hour showed the obstruction lying just within the internal sphincter. The anesthetic used was an A. C. E. mixture (alcohol, 1 part; chloroform, 2 parts; ether, 3 parts). The incision was three inches long and through the left rectus below the umbilicus. The abdomen was found to be quite full of bloody serum, and the intestines seemed to be massed entirely upon the left side. The point of inversion was located at the hepatic flexure. The bowel had a mahogany hue, but the application of hot towels slowly brought back the normal color. The ileum was gently withdrawn from the colon and no resection was done. The amount of bowel involved was about thirty-eight inches, and the cecum and appendix were included in the intussusception. The abdomen was closed without drainage, but dressings were renewed every twelve hours on account of the profuse serous discharge. The bowels moved four hours after operation, and nursing was begun twelve hours after the infant left the table. The infant then made a prompt and uneventful recovery.

I am led to consider briefly the chief diagnostic points:—

Pain in the abdomen is almost uniformly the first symptom; occurs without warning; is colicky in character; more or less continuous in the beginning, finally becoming intermittent. It is this intermittent character which deceives many into the belief that the condition causing the pain is subsiding.

Vomiting occurs usually simultaneously with the onset of pain or follows it very quickly; often is not continuous or projectile, but is always unaccounted for by any condition of the stomach alone.

The stools may contain feces and be passed with some flatus if the occlusion is not complete, but usually blood-stained, mucous stools without the presence of feces occur.

Tenesmus is usually severe and is a far more constant feature than is tympanites.

Tympanites is of a rather slow development and, as a rule, is not seen when the diagnosis is made within a few hours of onset.

The tumor is most often felt in the region of the sigmoid flexure, and when found is sausage-shaped and sensitive. It allows of considerable motion.

Prostration is of rather sudden development and is always much in excess of what might be expected from the other symptoms present.

The examination by the rectum should never be omitted and should be bimanual.

Borough of Brooklyn, New York City.

SPLENIC INFANTILE ANEMIA.—Wolff (*Deutsch. Med. Woch.*, Vol. XLIII., No. 49) describes a very severe case in a child, one year old, with only 467,000 reds and 37,800 whites, hemoglobin 40 per cent. The spleen was much enlarged and the anemia and cachexia were extreme. The spleen was removed without loss of blood under chloroform, the entire operation lasting 40 minutes. The child weighed 14 pounds and the spleen weighed about 1 pound and measured 19x11x3 cm. The blood picture altered at once for the better; in ten days the reds had increased more than tenfold and the child had gained 2 pounds in weight and continued to improve. Wolff ascribes the affection to some primary disturbance in the spleen.—*Journal of American Medical Association.*

ARCHIVES OF PEDIATRICS.

JULY, 1908.

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WARTS AND THEIR TREATMENT.

Warts are benign tumors of the skin. There are two varieties—the common wart, or papilloma, *verruca vulgaris,* and the flat, so-called juvenile wart, *verruca plana.* The term *juvenile* is hardly distinguishing and might well be dropped, since both varieties are peculiar, though not exclusively so, to youth and, if anything, the ordinary wart is of the two the more frequently seen in early life. Senile warts, though greatly resembling the flat wart, should in no sense be confounded with the latter; they are of an entirely different nature and will not be considered here.

The pathology of the two varieties—common and flat—is the same, both being due to a hyperplasia of the papillary and epidermic elements of the cutis, though in the flat variety the papillæ, while two or three times longer than normal, are never so indefinitely prolonged and never come quite to the surface as they do in the common wart, being always well capped with epithelium. The difference between the two varieties rests practically, then, on a clinical or symptomatic distinction.

The favorite seat for the common wart is the back of the hands and fingers. They are frequently found, too, around and under the nails, which may be greatly deformed by them, and in these situations become painful and are particularly difficult to eradicate. On the palmar surface of the hands and fingers they are less common. After the hands, though far less frequent sites, come the face, scalp and feet. On the body and upper segments of the limbs, common warts are so rarely found that they may be said practically not to occur in these situations.

On the plantar surface of the foot, while not so very unusual, the common wart is not always recognized. It becomes, however, exceedingly painful in this situation, to such an extent at times that walking is rendered impossible, and the condition often, more often, in fact, than not, is diagnosed as "painful callous." For this reason I venture to detail somewhat this variety alone, the ordinary run of warts in general being too familiar to all to warrant their description. The plantar wart is modified in appearance by reason of the pressure to which it is subjected and of the thickness of the epidermis in this region. It is generally situated on the tread of the foot, along the heads of the metatarsals or under the heel, more frequently in the former situation. At first glance it looks to be but a large and peculiarly painful callous of amberlike semitranslucence, hardly, if any, raised above the level of the skin. On closer examination, in some instances where the cornified mass has not yet entirely covered in the growth, there may be made out a small perforation at the centre, through which is seen the whiter and softer tissue of the embedded wart proper. The removal of this horny, surficial covering, which, in the case of a corn or callus, generally gives much relief, does not in the least diminish the pain of a plantar wart. This removal, while revealing more of the wart tissue, leaves it still surrounded and almost covered in by a hyperkeratotic ring. A curet swept around beneath this enclosing horny ring reveals the wart to be the shape of a wide-based cone with flattened top, the pressure to which it has been subjected having prevented an outward growth and causing the wart to burrow and make a lodgment for itself in the tissue of the foot, forming a round cavity larger at the base than at its orifice and reaching at times a depth of 2 cm.

From a clinical point of view, the flat wart is quite distinct in itself. As with common warts, it occurs principally on the hands and face. But while in the latter situation the common wart is very rare, it is here that the flat wart is most commonly found. On the hands and fingers, and especially their palmar surface, the flat wart is far less frequent than the common variety. Some statistics give the flat wart to be more frequent on the hands than on the face, but observation for some years at the Vanderbilt Clinic shows quite the reverse. The entire face may be covered thickly with flat warts, but usually they are found in scattered groups on the forehead, cheeks and chin. On the face this variety of wart appears as a roundish papule from 1 to 3 mm. in diameter, with smooth surface, scarcely at all elevated, yellowish in color, *café au lait,* or sometimes decidedly brown; then, again, so nearly like the normal skin in color and so smooth as to strongly resemble a lichen planus papule, but under a lens its fine mamellation may be made out, and, moreover, the face is exceptionally the seat of lichen planus; but on the hands, where this exception does not obtain, this presumption might be even stronger. While the elevation of the flat wart is ordinarily slight, hardly one-quarter of a millimeter, and is sharply defined, as its contour is abrupt, these features may be entirely lacking and the wart look to be but a small pigmented spot. Flat warts are even more indolent than the papillary variety.

and it is only by the sight of them that one is made aware of their existence. A single flat wart may be the starting point of a generalization, which may slowly and progressively, or quickly, within a few weeks, invade the hands and face with an abundant crop of warts, which spontaneously disappear after a few months, or may persist indefinitely without change.

That warts are contagious there is too much evidence for denial. Instances of autocontagion are not infrequent—a child will have had a single wart for quite a time, then in the immediate neighborhood other young warts will spring up, and later still others more widely distributed. The parent wart generally is made out by its greater size. They are seen at times—especially the flat variety—arranged in lines, as if inoculation had taken place along abrasions of the skin made by scratching.

Neither the common nor the flat wart ever undergoes epitheliomatous changes. It is only the confusion of the flat variety with the senile wart, or senile keratoma, that has led to this conception, and there is no basis for their removal on this score in either early or late life. Flat warts that occur in groups on the face in children need but to be lightly swept over with glacial acetic acid; the slight burning is not very painful, and with the subsequent peeling of the skin that takes place the warts come away, leaving no cicatrix. A 10 per cent. salicylic acid or resorcin ointment will cause a desquamation sufficiently active to remove the warts, but more slowly. Touching carefully with glacial acetic acid until saturated and allowing the subsequent crust that forms to stay in place until it falls of itself is the best method for isolated flat warts anywhere on the hands or face. For small common warts on the hands the quickest method is extirpation with a small, sharp curet, then touching the denuded surface, after the bleeding has been partly staunched by pressure, with the nitrate of silver stick. This stops further bleeding and no dressing is needed. A black crust forms, which falls off in a week or so, leaving an insignificant, if any, scar. The pain of the silver stick can be much mitigated by first cocainizing the surface after bleeding has been arrested. If this method is too painful, and it generally is, except for the smaller warts, glacial acetic acid is to be recommended. This causes no inconvenience by staining and is not very painful, but the process is slow, repeated applications having to be made before the entire removal of the wart is finally accomplished. Nitric acid is quicker, but leaves a yellow stain and is far more painful. Chromic acid has the same drawbacks. In using nitric acid care should be taken to cover the surrounding skin quite up to the base of the wart to be operated on, no matter how small a one, with a fairly wide ring of zinc oxide ointment; this will protect from a possible overflow of the acid onto the skin and a burn, with resulting disfiguring scar, be avoided. The action of nitric acid is difficult of control at best, and often the resulting cicatrix is worse than the original wart. I seldom use it, much preferring glacial acetic acid when I use acids at all.

Electrolysis for large warts is a very good method, but quite painful. The negative needle is plunged in deeply at the base of the wart, held there for a few seconds, then almost withdrawn and again inserted in another direction; this is repeated until the entire blood supply is cut off. The wart dries up and falls in a week or so, leaving a good scar. For removing very large warts or medium sized warts, single or in groups, and especially warts around and under the nails, where the use of acids gives poor and slow results, and the use of the curet and silver stick process or electrolysis is far too painful, liquid air is by all odds the best means, and with us at the Vanderbilt Clinic has practically superseded all others. After an application of liquid air of from thirty to forty seconds' duration, the wart in a few days has dried into a crust, which shortly falls, leaving but the most insignificant, if any, reminder on the skin, and the testimony is that the pain is less even than that caused by glacial acetic acid. Our former method of cureting seems now like butchery in comparison with the liquid air treatment.

CHARLES TOWNSHEND DADE.

Society Reports.

MINUTES OF THE TWENTIETH ANNUAL MEETING OF THE AMERICAN PEDIATRIC SOCIETY.

Held at the Water Gap House, Delaware Water Gap, Pa., on May 25 and 26, 1908.

FIRST SESSION, MAY 25TH, 10 A.M.

The meeting was called to order by the President, Dr. C. G. Kerley, who made a brief address of thanks to the Society for the honor of his election as President.

The following members were present: Drs. Isaac A. Abt, Chicago; George N. Acker, Washington; Samuel S. Adams, Washington; Allen Baines, Toronto; E. M. Buckingham, Boston; Augustus Caillé, New York; Walter Lester Carr, New York; Henry Dwight Chapin, New York; F. S. Churchill, Chicago; A. C. Cotton, Chicago; Floyd M. Crandall, New York; John Dorning, New York; Charles Hunter Dunn, Boston; Percival J. Eaton, Pittsburg; David L. Edsall, Philadelphia; Charles A. Fife, Philadelphia; Rowland G. Freeman, New York; E. E. Graham, Philadelphia; J. P. Crozer Griffith, Philadelphia; S. McC. Hamill, Philadelphia; Alfred Hand, Jr., Philadelphia; L. Emmett Holt, New York; John Howland, New York; A. Jacobi, New York; Charles G. Kerley, New York; J. H. Mason Knox, Baltimore; Henry Koplik, New York; L. E. La Fétra, New York; Frank S. Meara, New York; J. Lovett Morse, Boston; William P. Northrup, New York; Charles P. Putnam, Boston; Thomas Morgan Rotch, Boston; John Ruhräh, Baltimore; Irving M. Snow, Buffalo; Thos. S. Southworth, New York; A. H. Wentworth, Boston; J. Park West, Bellaire, O.; W. Reynolds Wilson, Philadelphia; J. E. Winters, New York.

There were present as guests: Drs. Simon Flexner, New York; Frederick H. Bartlett, New York; J. S. Wall and W. W. Wilkinson, of Washington; Frank J. Sladen, Baltimore; Charles A. Gardner, Colorado Springs; O. H. Edwards, Jr., Pittsburg; and Dr. Whiteway, Philadelphia.

Communications of regret at being absent were received from Drs. Booker, of Baltimore, and Jennings, of Detroit.

The minutes of the nineteenth annual meeting were adopted as published in the ARCHIVES OF PEDIATRICS, and Drs. Freeman and Ruhräh were appointed a committee to audit the report of the treasurer.

The President then invited the members and guests of the Society and their wives to enjoy a mountain drive that afternoon.

The following papers were read:

1. Dr. Simon Flexner, New York: "The Serum Treatment of Epidemic Cerebrospinal Meningitis."

2. Dr. Alfred Hand, Jr., Philadelphia: "The Diagnostic Value of the Chemical and Bacteriological Examination of Cerebrospinal Fluid."

3. Drs. J. H. Mason Knox, Jr., and Frank J. Sladen, Baltimore: "Hydrocephalus of Meningococcus Origin, with Remarks on the Serum Treatment."

4. Dr. Charles Hunter Dunn, Boston: "The Serum Treatment of Cerebrospinal Meningitis, with a Report of Cases."

5. Dr. F. S. Churchill, Chicago: "The Serum Treatment of Epidemic Cerebrospinal Meningitis (10 Cases)."

6. Dr. Henry Koplik, New York: "Other Methods of Treatment Compared to the Serum Treatment of Cerebrospinal Meningitis, with a Résumé of Cases of Both Methods of Treatment."

These papers were discussed by Drs. Holt, Rotch, Sladen (guest), Jacobi, Morse, Freeman, Wilkinson (guest), Adams, Kerley; and in closing by Drs. Knox, Dunn, Koplik and Flexner.

MONDAY.—AFTERNOON SESSION.

7. Drs. J. P. Crozer Griffith and R. L. Lavenson, Philadelphia: "Congenital Obliteration of the Esophagus, with the Report of a Case."

8. Dr. Samuel S. Adams, Washington: "Spasmodic Stricture of the Esophagus in an Infant Aged Four Months."

These two papers were discussed by Drs. Caillé, Putnam, Rotch, Jacobi, and, in closing, by Dr. Adams.

9. Dr. Alfred Hand, Jr., Philadelphia: "Exhibition of a Heart with Congenital Defect of the Ventricular Septum, and

Absence of the Pulmonary Artery: Symptoms of Angina Pectoris."

Discussion by Dr. Jacobi.

10. Dr. W. Reynolds Wilson, Philadelphia: "A Simple Method of Circumcision in the Newborn."

Discussed by Dr. A. C. Cotton, Chicago, and, in closing, by the essayist.

11. Dr. J. Park West, Bellaire, O.: "Pyelitis Terminating in Suppurative Nephritis.—Case and Specimen."

Discussion by Drs. Abt, Jacobi and Kerley.

MONDAY.—EVENING SESSION.

12. Dr. Henry Koplik, New York: "Poliomyelitis Anterior Acuta (An Epidemic)."

13. Dr. L. E. La Fétra, New York: "Early Symptoms in the Recent Epidemic of Poliomyelitis."

These papers were discussed by Drs. Holt, Jacobi, Abt, Morse, Kerley, and, in closing, by Dr. Koplik.

14. Dr. E. M. Buckingham, Boston: "Meningitis, Apparently Tubercular, Ending in at Least Temporary Recovery."

15. Dr. John Lovett Morse, Boston: "An Unusual Type of Acute Nephritis in Children."

Discussed by Drs. Koplik, Knox and La Fétra.

TUESDAY, MAY 20TH.—MORNING SESSION.

16. President's address: "Public School Education." By Dr. Charles Gilmore Kerley, New York.

17. Dr. L. Emmett Holt, New York: "Recent Diagnostic Methods in Tuberculosis of Children."

The paper was discussed by Drs. Northrup, Rotch, Caillé, Koplik, Hamill, Wentworth, and, in closing, by the essayist.

18. Dr. William P. Northrup, New York: "Fresh Air in the Treatment of Disease."

19. Dr. E. E. Graham, Philadelphia: "Fresh Air in the Treatment of Disease."

20. Dr. Henry D. Chapin, New York: "A Plan of Dealing with Atrophic Infants."

These three papers were discussed by Drs. Caillé, Jacobi, Freeman, Griffith, Buckingham, Putnam, La Fétra, Kerley, Adams, Churchill, Eaton, Morse, and, in closing, by Drs. Graham, Northrup and Chapin.

TUESDAY.—AFTERNOON SESSION.

21. Dr. Augustus Caillé, New York: "The Need of Postgraduate Instruction in Pediatrics."

22. Thomas Morgan Rotch, Boston: "Modern Laboratory Feeding and the Wide Range of Resources which it Provides."

Discussed by Drs. Holt, Chapin, Caillé, Griffith, Northrup, and, in closing, by Dr. Rotch.

23. Dr. Isaac A. Abt, Chicago: "An Inquiry into the Status of the Kindergarten."

Discussed by Drs. Rotch, Northrup, Churchill, Chapin and Kerley.

24. Drs. Thomas S. Southworth and O. M. Schloss, New York: "The Hard Curds of Infant Stools; Their Origin, Nature and Transformation."

Discussed by Drs. Abt, Morse, Hamill, Northrup, Kerley, and, in closing, by the essayist.

TUESDAY.—EVENING SESSION.

25. Dr. Charles A. Fife, Philadelphia: "Fat and Proteid Content of Top Milks."

Discussed by Drs. Griffith, Chapin, Southworth, Eaton, and, in closing, by the essayist.

26. Drs. J. H. Mason Knox and J. C. Meakins, Baltimore: "The Urinary Findings in a Series of Infants Suffering from Intestinal Infection."

Discussed by Dr. Abt.

The following papers were read by title:—

"Congenital Hypertrophic Stenosis of the Pylorus—Case," by John Dorning, M.D., New York.

"Recurring Empyema"; "Abscess of Lung due to Wire Nail Two Inches Long in Right Bronchus; Operation; Recovery, with Surgical Comments by Dr. H. M. Silver," by Francis Huber, M.D., New York.

"An Investigation of the Effects of Various Milk Modifiers upon the Gastric Digestion of Infants," by L. Emmett Holt, M.D., and Thomas W. Clarke, M.D., New York.

"Some Observations Regarding a Fourth Exanthem—the So-called Duke's Disease," by A. C. Cotton, M.D., Chicago.

EXECUTIVE SESSION.—10 P.M.

The special Committee on Revision of the Constitution made its report, which was accepted and, with certain amendments, adopted.

The report of the Council was read by Dr. Rotch, and its recommendations adopted, as follows:

As officers for the ensuing year there were elected:

President, Dr. Charles P. Putnam, Boston.

First Vice-President, Dr. Isaac A. Abt, Chicago.

Second Vice-President, Dr. Thos. S. Southworth, New York.

Secretary, Dr. Samuel S. Adams, Washington.

Treasurer, Dr. J. Park West, Bellaire, O.

Recorder, Dr. L. E. La Fétra, New York.

As member of the Council to take the place of Dr. Rotch, retiring, Dr. Alfred Hand, Jr. As member of the Executive Committee, Congress of American Physicians and Surgeons, Dr. A. Jacobi; alternate, Dr. J. P. Crozer Griffith.

Elected to membership: Dr. Matthias Nicoll, Jr., New York.

Elected to honorary membership: Dr. Charles Rauchfuss, St. Petersburg, Russia.

The Secretary reported that Prof. Schlossman, of Düsseldorf, had been invited to be present at the meeting, but had sent a letter declining and expressing his appreciation of the honor.

The report of the Treasurer was reported correct by the Auditing Committee, Drs. Freeman and Ruhräh.

The annual assessment for dues was made $10.

It was decided to hold the next annual meeting at Lenox, Mass., on May 27 and 28, 1909.

The Secretary moved a vote of thanks to the President for one of the most successful meetings the Society had ever had, and this was accordingly given.

Samuel S. Adams, M.D.,
Secretary.
Linnæus Edford La Fétra, M.D.,
Recorder.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, March 10, 1908.

J. P. CROZER GRIFFITH, M.D., PRESIDENT.

A CASE OF SPORADIC CRETINISM.

DRS. C. F. JUDSON and W. N. BRADLEY showed this case. (See page 523.)

DACTYLITIS TUBERCULOSA.

DR. JAMES K. YOUNG showed a case of tuberculous dactylitis in an Italian boy, aged seven years. Four years ago he had an abscess of the right thigh, and a year later one of the left thigh, both of which were incised. Subsequently two lesions appeared in the skin, on the left wrist and right knee, which had all the characteristics of lupus. A kyphos developed in the lumbar region about the same time that the second abscess formed, and a year ago Dr. Young operated for double lumbar abscess. The dactylitis for which he was presented dated back two years and was characteristic in appearance. The proximal phalanges of the index, ring and middle fingers on the right hand were enlarged and contained numerous discharging sinuses. X-ray showed the formation of new bone in the periosteum, and examination of the pus from the sinuses showed the presence of staphylococcus. No tubercle bacilli had been obtained from any of the sinuses, but the spinal deformity was so characteristic, and the dactylitis corresponded with the usual form of tuberculous dactylitis so closely that the case was presented as one of this variety.

STREPTOCOCCUS DACTYLITIS.

DR. YOUNG reported this case. He called attention to the fact that up to the present only two forms of dactylitis had been considered, syphilitic and tuberculous dactylitis. The discovery of the streptococcus as a cause of dactylitis by Dr. Young led him to believe that this should be considered as a possibility in considering the etiology of dactylitis. The case was that of a girl, one year old, whose right ankle joint became infected with streptococcus. Abscesses formed in other parts and dactylitis developed in the left hand. The finding of the streptococcus in the dactylitic thumb would seem to establish the possibility of this germ as a cause of dactylitis. The characteristic symptoms of this form of dactylitis are its origin in the synovial membrane, the involvement of all the structures of the joint, its rapid, painful progress and ankylosis or destruction of the articulation. The treatment recommended was incision and curetment. The importance of bacteriological diagnosis in doubtful cases was insisted upon.

DR. F. C. KNOWLES showed the picture of a three-year-old girl at St. Vincent's Home. The proximal phalanx of the middle finger on the right hand was the one involved. Over the tuberculous dactylitis was a split-pea-sized patch of lupus vulgaris.

DR. S. McC. HAMILL said that he had applied the ophthalmo-tuberculin reaction, in the case spoken of by Dr. Knowles, with a positive result.

DR. A. P. C. ASHHURST said that he had seen a large number of cases of dactylitis at the Children's Hospital, and he would like to know how best to decide whether they were tuberculous or syphilitic. He showed a photograph of one case, practically a duplicate of Dr. Young's case, in which two fingers were involved, showing sinuses and distinct granulations; the diagnosis in this case had been tuberculous dactylitis. There was one termination of syphilitic dactylitis to which Dr. Young had not called attention—that form in which the proximal phalanx (that usually affected) becomes absorbed, leaving a shortened and flail-like finger. This termination Dr. Ashhurst believed to be more frequent than ankylosis as described by Dr. Young.

DR. L. J. HAMMOND referred to the treatment of dactylitis, especially in the tuberculous cases, by Bier's passive hyperemia. He used it recently in 2 cases, 1 of which, an adult, was entirely cured, and the other, a child under three years of age, while not entirely cured when last seen, was decidedly improved, even in face of the neglect on the part of the mother to carry out the treatment systematically. In the absence of mixed suppurative conditions of the joint, this treatment should be given a trial.

DR. T. S. WESTCOTT was most interested in the case of streptococcus dactylitis, as he had seen it in consultation.

DR. EMERY MARVEL thought that, when the primary lesion was dactylitis, excision should be considered. He had seen a case in which fatal termination for tuberculous meningitis resulted after tuberculous dactylitis. He wondered whether it would not be best to amputate the affected fingers early, before further infection occurred.

Dr. J. H. McKee recalled a case of dactylitis in a negro, aged four years, who apparently had syphilitic dactylitis. Only after long-continued mixed treatment was any effect noted. Syphilitic dactylitis is usually symmetrical and affects all fingers on both hands. He thought Dr. Ashhurst's case surely tuberculous dactylitis.

Dr. D. J. M. Miller advised using tuberculin in making the diagnosis between the tuberculous and syphilitic forms of dactylitis. He had used it repeatedly, even in young infants, and had come to regard it as a most valuable means of diagnosis.

Dr. Young said that the differential diagnosis between specific and tuberculous dactylitis has been frequently discussed and could be found in all text-books. He lays stress on the signs found elsewhere in the patient and on the family history. Besides, the use of continued antisyphilitic treatment was of value. He had not employed the Bier hyperemia method in treating these cases. Dr. Young was impressed by the rapidity with which the streptococcic case advanced. Amputation of primary tuberculous dactylitis might be considered, but might usually be avoided by prompt excision of the affected area. If mixed infection occurred with tubercle bacilli or other organisms, the affected finger might require amputation. Besides, tuberculous dactylitis was unilateral, while syphilitic dactylitis was bilateral. The use of tuberculin was of great importance in making the diagnosis, and the ophthalmic test advised by Calmette was of value, responding in about 60 per cent. of his cases. The new tuberculin, Koch TR, is, in Dr. Young's experience, the best for injection.

POLIOENCEPHALITIS INFERIOR.

Drs. C. F. Judson and H. L. Carncross reported this case, a boy of four years, who became ill gradually, first showing, according to the mother, stiffness on coming downstairs in the morning. He soon staggered, held his head to the right side and turned his right eye inward. On admission to St. Christopher's Hospital for Children, three weeks after onset of the trouble, the patient had a marked cerebellar ataxia, with some paralysis of both external recti, more marked on the right side, deviation of the tongue to the left, and a very slight obliteration of the nasolabial fold on the left. There was no loss of power or wasting in the extremities, nor were there any sensory changes. There were mild degree of stupor, slight fever, abolition of the deep reflexes and incontinence of urine and feces. He had a coarse tremor of the hands on being roused. There was no incoordination in the recumbent posture. The temperature became normal two weeks after admission, and the boy's condition improved. Six weeks after admission, a typical uneventful attack of typhoid fever began and ran a course of three weeks, without developing new nervous symptoms. After two weeks' convalescence in the country the boy had completely recovered. The course of the disease was, therefore, barely three months.

Dr. Young called attention to the classification of these palsies, from the standpoint of the orthopedic surgeon.

THE TECHNIQUE OF LUMBAR PUNCTURE AND THE VALUE OF CYTODIAGNOSIS IN DIFFERENTIATING THE EPIDEMIC FROM THE TUBERCULOUS FORM OF MENINGITIS.

Dr. E. Burvill-Holmes described the value of this operation, both from a therapeutic and a diagnostic standpoint. (This article will appear in a later issue of the Archives of Pediatrics.)

CONGENITAL UNILATERAL HYPERTROPHY.

Dr. C. H. Muschlitz reported this case in an infant of four months. Only the left arm and left leg were involved. The condition was first noted by the mother when the child was one and one-half months old. The radiogram showed involvement of the muscular and subcutaneous tissue and very slight enlargement of the bony structure. In reviewing the literature, it was noted that this form of hypertrophy was quite rare and record of a left-sided case exactly like this was not found.

HETEROTAXIA WITH UNUSUAL HEART MALFORMATIONS.

Drs. B. F. Royer and J. D. Wilson reported a case of complete transposition of the viscera without dextracardia and with anomalies of the heart and blood vessels.

Drs. W. M. L. Coplin and J. P. Crozer Griffith discussed this case.

THE CHICAGO PEDIATRIC SOCIETY AND THE CHICAGO MEDICAL SOCIETY.

Joint Meeting, February 19, 1908.

J. W. VanDerslice, M.D., Chairman.

SYMPOSIUM: GONORRHEA IN CHILDREN.

THE HISTORY OF GONORRHEA IN CHILDREN.

Dr. Julia D. Merrill read this paper, and referred briefly to the history of gonorrhea in general.

The year preceding the publication of Neisser's discovery of the specific organism, Dr. I. E. Atkinson reported an epidemic of vaginitis in a charitable institution of Baltimore. For over a year there had been a baffling epidemic of ophthalmia and stomatitis among the children. He believed the infection was conveyed from the ocular and buccal mucous membranes to the vulva.

The first large epidemic was described by Pott, of Halle, in 1883. More than half of these cases were in children under five years of age. Frankel was the first to carry on bacteriological examinations of a series of cases in Hamburg during the years from 1881 to 1884. Nearly all of his 63 cases were from girls admitted for scarlet fever. Later writers have also noted the great susceptibility to gonococcus vaginitis in scarlet fever patients.

Epstein, in his study of the bacteria present in the newborn, found 3 cases of vaginitis among the 625 infants examined. He concluded that many cases might be easily overlooked and date back to an antepartum origin.

Reports of epidemics followed in rapid succession from Buda Pesth by Czerni, from Stockholm by Dursch, from Paris by Ollivier and Comby, from Nüremberg by Cnopf, from Boston by Morse, from New York by Koplik, Heiman, Welt-Kakels, Trenwith, Sheffield and Holt, from Cincinnati by Rachford and several others, and from Sidney, Australia, by Plomley. In the

New York Medical Journal, March 18, 1905, Holt gave the account of his long war against the infection in the Babies' Hospital, where the epidemic lasted eleven years. From Chicago the only published epidemic was that described by Dr. A. C. Cotton, in which the bacteriological work was done at first by Dr. Grieg, and later by Dr. Baer, and reported by him also.

Dr. Geo. H. Weaver read a paper on

THE PATHOLOGY OF GONOCOCCUS INFECTION IN CHILDREN.

He said that gonococcus infections in children were essentially the same as those in adults and the complications in both were alike. A separate consideration of the disease in children was, however, warranted by the rather frequent occurrence of epidemics of vulvovaginitis of gonorrheal character among young girls, especially in public institutions, where the infection was effected by means which did not often operate in adults.

Infection was accomplished by the direct or indirect transfer of secretions containing the gonococcus from one individual to another. Because of the very limited viability of the organism in a dry state, the infection must usually be accomplished before the transferred secretion had become dry. In children an intermediate carrier is usually responsible, except in ophthalmia, where infection may be produced during birth. The female sex furnished the great majority of cases of genitourinary infection, because of the peculiar susceptibility of the urethral and vaginal mucous membrane in young girls. The age of greatest susceptibility appeared to be from 2 to 5 years. An attack of scarlet fever seemed to render the subsequent infection particularly easy.

The mucous membranes which may be primarily infected in the child are in boys the urethra, in girls the urethra and vagina, and in both sexes the conjunctiva, the rectum and the mucous membrane of the mouth. From any one of these locations the infection may be carried in the secretions to other sites in the same child, as from the vulva to the conjunctiva. The gonococcus first multiplied upon the surface of the mucous membrane, then penetrated between the epithelial cells and finally reached the upper layers of the submucous connective tissue. This was accompanied by a pronounced serous and cellular infiltration of the mucous membrane, with a loosening and desquamation of the epithelium, and an abudant secretion of pus from the surface. In boys the process might extend from the urethra upward as in adults. The oral and rectal infections were infrequent as primary infections. In girls the rectum was most often infected secondarily by secretions from the vulva. In boys it might be the primary infection, and so become dangerous as a source from which the disease might be spread among female children.

In the genitourinary infection in girls the urethra was probably first involved in most instances, but the vagina was early invaded by the disease. From the vagina extension upward to the cervix was usual, and the extension might pass to the uterine cavity, the Fallopian tubes and the peritoneal cavity. Pyosalpinx and abscess of the ovary have been observed. The peritonitis may be localized or general, acute or subacute. The acute form appeared more dangerous than in adults. Pseudoabscess of the Bartholinian gland may follow extension along the duct. The acute process in the genitourinary tract was soon over, but a subacute or chronic process often continued for a long time, sometimes for years. It is not unlikely that such an attack in infancy or childhood might be etiologically connected with underdevelopment or maldevelopment of the sexual organs in later life.

Besides the local infection of mucous membranes and direct extension through the Fallopian tubes to the peritoneum, the infecting organisms might travel by the lymph or blood channels to the heart valves, to the spleen, to the joints, to the tendon sheaths and bursæ, to the pluræ and pericardium.

The joint inflammation was usually limited to one or a very few joints. Most such joint inflammations terminated in resolution. In those which become purulent, subsequent adhesion and ankylosis of the joint often occurred. Metastatic abscesses in muscles have been observed in connection with general infection by the gonococcus. The general and metastatic infections might be secondary to a primary infection in any of the mucous membranes previously mentioned.

Besides the pathologic processes with which are associated the local presence and multiplication of gonococci, certain phenomena ascribed to the action of soluble toxins were also observed in connection with gonococcus infection. Certain instances of neuritis, myelitis and muscular atrophy were to be explained in this manner.

Dr. W. L. Baum spoke on

THE CLINICAL AND BACTERIOLOGICAL DIAGNOSIS OF GONORRHEA IN CHILDREN.

Dr. Baum said that the clinical diagnosis of gonorrheal vaginitis in small children differed somewhat from that in older individuals, in that the clinical symptoms in small children in epidemic gonorrheal vulvovaginitis were much milder and were usually overlooked. Cases of gonorrhea in small children, which were the results of contusions, traumatisms, such as occur during rape, all had the clinical picture and subsequent course of an ordinary gonorrhea in older individuals. He thinks that here was where the difference came in in gonorrheal vulvovaginitis which took place in the case of small girls. In the majority of them the symptoms were of such a mild type in the beginning, and the infections of the urethra are so rare that they were overlooked until such a time when the discharge became copious and more purulent in character.

Dr. A. C. Cotton read a paper on

THE PROPHYLAXIS OF GONORRHEA IN INFANTS AND CHILDREN.

Dr. Cotton said that prophylaxis was of paramount importance. That the energetic and persistent treatment of every case of gonorrhea until an apparent cure be effected with systematic periodical examination of the patient thereafter is a necessity in arresting its spread. Parents and nurses should be taught the true nature of the infection, and that a discharge from vulva, urethra or rectum should be viewed with suspicion and call for immediate examination by a competent physician. The possibility of infection with arthritic and periarthritic suppuration and the formation of multiple abscesses with no apparent lesion of the mucosa should ever be kept before the profession and taught to the laity. The laity must be informed that every father who has at any time suffered from a urethritis and that every mother who has a leukorrhea may prove a source of infection to their innocent babies and children in a score of ways through the common domestic procedures.

Every hospital or institution for children, whether public or private, must be protected from infection from without by well arranged detention wards in which the newly admitted patient may be submited to the closest scrutiny for a period of at least fourteen days to determine his freedom from acute infections before his admission to the general wards or apartments. Repeated smears of the secretion of all available mucosa must be examined microscopically and culturally. All institutions for the occupancy of infants and children must have ready for use properly located isolation wards to which cases may be promptly removed upon the first apearance of suspicious signs or symptoms of infection. Every suspicious case must be specialized not only as to bed, linen, clothing, diapers (all should be diapered regardless of age), feeding utensils, bed pan, urinal, thermometer, douche apparatus and catheter, all of which should be marked with patient's name. The nurse and interne who undertakes the care and treatment of the gonorrheal patients must not be allowed to come in contact with clean cases. The attending physician should visit such patients last in his round and then disinfect himself as in going from any other case of acute contagion. The diapers would better be destroyed immediately after removal and not placed in the receptacle for soiled clothing. Cheese cloth is excellent material for this purpose. All clothing and bed linen must be immediately placed in disinfecting solution and passed through the steam sterilizer before going to the general laundry, as it has been repeatedly demonstrated that the ordinary hospital steam laundry did not sterilize against this infection. No clean child should be bathed in a tub previously used for a gonorrheal case.

In every children's hospital repeated routine examinations of all the patients by smears from the mucosa must be made with bacteriological determination, for eternal vigilance is the price of exemption from oft recurring epidemics of gonorrhea.

Dr. William J. Butler read a paper on

THE VACCINE TREATMENT OF GONORRHEA IN CHILDREN.

Dr. Butler gave comparisons of 12 cases treated locally and 12 by vaccine therapy, and concluded that vaccine therapy had a place in the treatment of gonorrhea in the female; that it appeared to be far more efficient and at the same time scientifically more tenable than local antiseptic treatment.

DR. ADOLPH GEHRMANN said that the thing that struck him at once in Dr. Weaver's paper was the widespread distribution in the amount of damage the gonococcus can do in the human subject. As to the origin of the infection, he thought that if the eyes of the child could be infected through the genital tract of the mother in delivery, the genital tract might become infected in the same way.

DR. EFFA V. DAVIS said she wished to speak particularly with reference to the manner in which physicians had treated this disease from an ethical standpoint. It was a matter which has been kept secret. It has been considered ethical for the physician to hide the disease, especially in the cases of women acquiring it from their husbands. There were a great many cases in which the patient herself does not know the character of the disease. In this way she spread it, and these cases usually occurred in private practice and not in hospitals. Every effort should be brought to bear in informing the patients. It was not only the physician's duty to the patient, but his duty to the public. A frank statement should be made to the patient as to how the disease is acquired and the best means given of checking its spread.

DR. ALICE HAMILTON said that all cases of vaginal discharge in little girls were suspicious when no cause for it could be discovered, and when such a discharge shows leukocytes and a few bacteria it is very suspicious of gonorrhea, and repeated examinations should be made before the case was pronounced non-gonorrheal. As Dr. Baum had said, such a case might go on for months without the discharge becoming purulent, and then under the influence of some acute infectious disease the real character would be discovered.

DR. RUTH VAIL concluded that the index in the vaccine treatment is of great value, and that the vaccine treatment itself was one to be commended. It could be used in a greater number of cases than any other method and with less disadvantage, both to the patient and to the doctor.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. L. C. AGER.	DR. JOHN HOWLAND.
DR. HENRY HEIMAN.	DR. M. NICOLL, JR.
DR. ALFRED F. HESS.	DR. G. R. PISEK.

DR. S. W. THURBER.

PATHOLOGY.

GUINON AND PATER: RENAL COMPLICATIONS IN THE COURSE OF IMPETIGO AND IMPETIGINOUS ECZEMA. (*La Pathologie Infantile,* January 15, 1907, p. 1.)

The writers cite a number of cases in which nephritis has been associated with these skin lesions in young children. They are inclined to the belief that the infection is a direct one and due to an insufficiency of the neighboring lymphatic barrier. Other observers have isolated pyogenic organisms from the kidney in such cases.

M. NICOLL, JR.

FINKELSTEIN, L.: BANTI'S DISEASE IN CHILDREN. (*Jahrb. für Kinderhk.,* December 1, 1907, p. 694.)

The essential features of Banti's disease are a primary enlargement of the spleen associated with anemia, followed by cirrhosis of the liver and ascites.

Banti divides the disease into three periods. In the first period there are present enlargement of the spleen, considerable anemia, and a slight enlargement of the liver. The usual duration of this period is three to four years, but occasionally it may last ten to eleven years.

The second is a transitional period of short duration. The urine diminishes in quantity and there is an increased amount of urates. Urobilin is present, and occasionally traces of bile pigment can be demonstrated. Slight icterus of the skin develops at this stage of the disease. The patients suffer at irregular intervals from dyspeptic attacks.

In the third period the liver becomes smaller, ascites develops, and the anemia and icterus become more intense. This stage lasts about five to six months, and invariably ends in death.

Senator, as a result of his extensive experience with this disease, has added some features to the clinical picture of the disease as described by Banti. He found the occurrence of bleeding from the gastrointestinal tract and other parts of the body a frequent symptom. He thinks that ascites is not due to cirrhosis of the liver, but to changes in the blood-vessels of the peritoneum, the result of the action of unknown toxins. The changes in the urine he does not consider of great diagnostic importance; the changes in the blood are, however, characteristic of the disease. There is a great diminution of the red blood corpuscles, a still greater diminution of the hemoglobin, and a marked reduction in the white cells. The differential count is normal; occasionally there is an increase in the number of the mononuclear cells.

In the differential diagnosis, we must consider cirrhosis of the liver, malaria, abdominal Hodgkin's, syphilis, and tuberculosis. In cirrhosis the spleen is rarely as large as it is in Banti's disease. The history of alcoholism, and other etiological factors, are of great diagnostic importance.

The etiology of Banti's disease is at present unknown. Its discovery will clear up many obscure points which, on account of their number and importance, have led some observers to deny that this morbid condition is a clinical entity.

HENRY HEIMAN.

HARGRAVE, EDWARD T,: IMPERFORATE VAGINA AND ABSENCE OF ANUS. (*The American Journal of Obstetrics,* August, 1907, p. 211.)

The case is reported because of its rarity. There was complete absence of any opening where vagina should be. A meatus was present; operation was made and a presenting portion of gut opened and anchored. Recovery was uneventful, and its health good up to fourteen months, when it died of an acute intussusception.

G. R. PISEK.

NEUMANN, S.: THE KIDNEYS IN ALIMENTARY INTOXICATION. (*Jahrb. für Kinderhk.,* December 1, 1907, p. 633.)

In alimentary intoxication the quantity of urine is diminished in inverse ratio with the quantity of water lost through other channels. The specific gravity varies with the amount of urine. The amount of albumin is usually very small. It is demonstrable for two to five days, and disappears with the improvement in the general condition. The sediment shows casts, often in considerable number. They may be absent during the height of the disease, and may increase in number with the increase in the amount of urine. The albumin persists for a somewhat longer time than the casts. There are very few epithelial cells and leukocytes.

The author thinks that these changes indicate an irritation of the kidneys, but no true nephritis. Microscopical examination has shown no parenchymatous or interstitial lesions in the kidneys.

HENRY HEIMAN.

MEDICINE.

HEUBNER, O.: PYLOROSPASM. (*Die Therapie der Gegenwart,* October, 1906, p. 433.)

The observations made by Heubner are based on 21 infants seen in private practice. He says that pylorospasm occurs in 0.5 per cent. of all children's diseases. He believes that there is an hereditary disposition to the disease. The diagnosis is based upon (1) peristaltic waves from left to right in the fundus of the stomach, (2) the vomiting, (3) decrease in the amount of urine, (4) the constipation. He wishes to distinctly distinguish pylorospasm from pyloric stenosis. Hypertrophy at the pylorus is a secondary phenomenon resulting from the continued contractions. Gastrospasm he prefers as a better term, and regards it as due to defects in innervation of the unstriped muscles.

The best treatment is rest. Gastric lavage is not recommended. Food should be given at longer intervals and in greater quantity. Operative interference should be a last resort; the mortality in the operative cases being 50 per cent. G. R. PISEK.

COMBY, J.: ACUTE ENCEPHALITIS IN CHILDREN. (*Archives de Médecine des Enfants,* October, 1907, p. 577.)

The author gives in detail the histories of 25 cases of acute encephalitis and discusses the symptomatology. The onset is usually sudden, seldom preceded by prodromata other than those of the diseases to which it is secondary (influenza, eruptive fevers, pertussis, etc.). Convulsions are the rule, often repeated. These are succeeded by coma, more or less marked, with flaccid extremities, though there may at times be contractures. There is usually no rigidity of the neck, or Kernig's sign, and the cerebrospinal fluid obtained by lumbar puncture shows nothing abnormal. Subsequently a spastic condition of the muscles of the extremities succeeds, with exaggeration of the reflexes. The majority of the spastic hemiplegias of infancy are the result of acute encephalitis. Sometimes the paralysis disappears entirely. There may be all degrees of damage to the child's mental condition. A few remain entirely normal, others show loss of memory, incapacity for application, an alteration of disposition, and even idiocy may be the outcome. Epilepsy at times develops. The treatment is briefly outlined. JOHN HOWLAND.

KESSLER, J. B.: BLASTOMYCOSIS IN AN INFANT. (*The Journal of the American Medical Association,* August 17, 1907, p. 550.)

Kessler reports in full with illustrations a case of blastomycosis in an infant eight months old, which reacted very favorably to the use of potassium iodid. G. R. PISEK.

SURGERY.

PETTIJEAN AND CHALIER: TUBERCULOUS OSTEITIS OF THE LONG BONES OF THE HAND AND FOOT: SPINA VENTOSA. (*Gazette des Hôpitaux,* January 12 and 19, 1907, pp. 51 and 87.)

This is a lengthy review of this subject, giving an historical résumé and some interesting statistics. The article does not refer exclusively to children, but the writers state that the disease is most frequently seen in young children. Congenital cases have been reported. It is not infrequently associated with other tuberculous lesions of skin, glands, joints, etc., but it is not so frequently seen in connection with visceral tuberculosis. In other words, it is a manifestation of the attenuated type of tuberculous infection to which the name scrofulosis has been given.

The lesions are seen more frequently in the hand than in the foot, and usually the lesions are multiple. The lesion may be subperiosteal, but this is infrequent. As a rule, the infection shows itself in the medullary canal. There may follow a gradual thickening of the bone, a gradual destruction, or a rapid necrosis.

The onset is usually gradual, although acute cases are reported. Pain is an early symptom, but it is not severe and may be overlooked until there is marked enlargement of the bone. There is first a period of simple inflammation, then suppuration and, finally, fistulization. The lesions usually remain localized and are curable if properly treated. Unfortunately, considerable deformity is apt to result, and the fingers may become so ankylosed or dislocated as to require amputation to facilitate the use of the hand.

In typical cases the diagnosis is simple, but the disease may at times be confounded with syphilitic dactylitis, osteomyelitis, simple periostitis, suppurative arthritis and osteosarcoma.

The treatment should be: immobilization, local applications of iodin and general hygienic treatment. Later various surgical measures may be necessary, but they should not be resorted to too early, as spontaneous cure may occur. L. C. AGER.

CAUBET, HENRI: OSTEOMYELITIS OF THE HIP, PARTICULARLY IN THE INFANT. (*Gazette des Hôpitaux,* February 9, 1907.)

By hip the author means the upper extremity of the femur and the cotyloid cavity of the joint. Because the hip-joint is the largest and the most deeply situated in the body, its examination is the most difficult and its infection the most serious. An early diagnosis of an osteomyelitis in this region is, therefore, of great importance.

Osteomyelitis of the hip may originate either in the cotyloid cavity or the upper extremity of the femur. The steps of ossification explain the usual points of infection. In the cotyloid cavity, up to the fourteenth year, the bony parts are separated by a Y-shaped cartilage, which is the most frequent point of primary infection of this part of the hip. In the formation of the upper end of the femur there are the "conjugate" cartilages, which are partly inclosed within the joint; when they are infected, the infection at once spreads to the synovial membrane. Outside the joint there are two cartilages forming the greater and the lesser trochanter. That of the greater trochanter sometimes becomes infected and the infection works along the neck into the joint. Also, in rare instances, an infection in the marginal iliac cartilage may travel into the joint along the Y-shaped cartilage.

When the osteomyelitis starts in the cotyloid cavity and produces a purulent arthritis, the result is always fatal. In case of infection of the femoral cartilages the joint is usually infected, but there are exceptions. The infection may extend in the other direction—toward the diaphysis; or the infection may be subperiosteal; or it may be in the region of the greater trochanter and remain localized and, finally, come to the surface. The early symptoms are those of general infection, and in small children the location of the trouble may not be discovered for some time. The local symptoms are pain and rigidity.

The authors describe at length the various complications, and also the deformities in cases of recovery. L. C. AGER.

HYGIENE AND THERAPEUTICS.

WASSERMAN, A.: THE PRESENT STATUS OF THE TREATMENT OF CEREBROSPINAL MENINGITIS WITH MENINGOCOCCUS SERUM. (*Deutsch. med. Woch.*, September 26, 1907, p. 1,585.)

Although 102 patients have been treated with Wasserman's serum, in only 57 cases are the data sufficiently accurate and full to judge of its efficacy. Of these cases, 27 died, a mortality of 47.3 per cent. However, of those treated during the first week of the disease, but 35.1 per cent. died, and, of 21 cases treated during the first three days, but 25 per cent. succumbed. From this it would seem that the serum has value only during the early stage of the illness, as we should expect in a treatment which aims to produce a passive immunity. The serum was injected subcutaneously or, in severe cases, into the spinal canal, and, although used repeatedly in doses of 5 c.c. to 10 c.c., proved itself always innocuous.

In view of this rather favorable preliminary report, it will be interesting to see what are the results obtained in this country from a serum of a similar nature. ALFRED F. HESS.

KILLIAN, PROF. GUSTAV: THE TREATMENT OF FOREIGN BODIES IN THE RESPIRATORY TRACT AND ESOPHAGUS. (*Annals of Otology, Rhinology and Laryngology,* June, 1907, p. 251.)

In this address, delivered in New York on May 30th, the author goes into the minute details of the kinds of foreign bodies found and the methods of extracting them, with the following résumé of results from tracheobronchoscopy. One hundred and sixty-four cases have been published up to the present time and show many imperfections in method. In spite of this, remarkable results have been secured. Out of 159 cases, 13 per cent. died—2 from cocain, 2 where it was impossible to remove the object on account of bronchial stenosis, 1 from suffocation in spite of upper and lower bronchoscopy, and the remaining 16 died of pulmonary complications, 5 with the foreign body in the lung, and the others in spite of its removal. Upper bronchoscopy has been fully successful in 54 cases and lower bronchoscopy in 63. In but 2 cases was he unable to find the foreign body. Many of the 18 cited cases of bodies in the air passages and the 17 cited cases of those in the esophagus were in young children, and the importance of early diagnosis and relief cannot be too strongly urged. S. W. THURBER.

ESTOR, DR.: DEVIATIONS OF THE FIGURE IN YOUNG GIRLS. (*Annales de Médecine et Chirurgie Infantiles,* April 15, 1907, p. 258.)

This was a lecture delivered at the polytechnic of the Eastern Pyrenees. The title is rather a misnomer, as the paper is almost entirely devoted to the discussion of scoliosis in school girls. After mentioning various other deformities of the hips, spine, etc., the author states that scoliosis is at the same time so frequent and yet so much the fault of the present system of education that it ought to receive more attention than is ordinarily given to it.

The causes are classified as: (1) Predisposing. (*a*) Weakness of the muscular system. (2) The influence of heredity. (*b*) Determining causes. These are grouped as the various faulty attitudes assumed by girls in writing, in playing the piano, etc.

The muscular weakness is the result of the faulty habits of living, which are so numerous in the school and home life of French girls of the better class. The writer speaks very enthusiastically of the athletic life of American girls and mentions the good work of the schools of New York City. Great emphasis is laid upon heredity as a factor, and the writer quotes Kirmisson in support of this view.

The treatment is divided into preventive and curative. The preventive treatment is hygienic and sea bathing is particularly recommended. Rest in the fresh air is important. The question of corsets is discussed at length, and the writer concludes that a properly constructed corset is useful. The proper writing desk is described at some length.

The curative treatment depends upon the degree of the deformity. The first degree is that in which the curvature can be voluntarily corrected by the patient. In such cases the treatment is very similar to that employed for prevention, and, in addition, the various orthopedic exercises are resorted to. Massage should also be employed extensively.

In the second degree—in which the patient cannot correct the deformity, but it disappears under the influence of suspension—all the methods of treatment already described are to be employed, and, in addition, the orthopedic corset must be applied. According to the writer, the corset must not be expected to correct the deformity, its only value is in its power to maintain the improvement produced by the daily treatment. The corset should be made of soft leather reinforced with metallic supports. It should not be made by measurement, but it should be fitted over a plaster cast of the patient, during suspension.

The third degree of scoliosis is that in which suspension does not correct the deformity. The milder of such cases can be greatly helped by the treatment already described, but most can only be benefited by forcible correction under anesthesia, and this treatment is somewhat uncertain. L. C. AGER.

CURSCHMANN, HANS: A METHOD OF ARTIFICIALLY INCREASING THE PRESSURE OF THE CEREBROSPINAL FLUID IN PERFORMING LUMBAR PUNCTURE. (*Die Therapie der Gegenwart,* August, 1907, p. 348.)

The author reports a case of a nine-year-old boy with distinct symptoms of meningitis cerebrospinalis epidemica, on whom he did lumbar puncture. No fluid flowed from the needle, but its point contained thick purulent material. The author then directed a chlorethyl spray to the upper part of the thighs, and the fluid at once began to drop and then flowed in a slow stream. As soon as the cooling was stopped the fluid ceased to flow; by continued cooling, 15 c.c. of fluid were obtained. The condition of the patient improved. On the next day the lumbar puncture was repeated with the same results. The thick fluid at first would not flow out, but appeared upon the application of ice to the lower extremities. The patient improved and is convalescent. He recommends this method not only for purulent meningitis, but also in all other cases where at puncture there is only a scanty flow, and where an acceleration of the process is desirable.

G. R. PISEK.

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ARCHIVES OF PEDIATRICS.

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Original Communications.

THE MODERN BABIES' DISPENSARY.*

BY H. J. GERSTENBERGER, M.D.,
Medical Director of the Babies' Dispensary and Hospital, Cleveland, O.

The object of the modern Babies' Dispensary is to lessen infant mortality.

Although statistics relating to the death rate of infants were compiled at least fifty years ago, it has been but recently that active work was begun to limit this enormous destruction of human life.

In 1892 Budin started his Consultation de Nourrissons in Paris, and in 1893 Nathan Straus his pasteurizing milk laboratory in New York. With these exceptions, but little had been accomplished until 1900. From about this time on European and American countries and states have done much to alleviate this evil, which is at present the biggest scourge of civilization.

The method of procedure, except in Budin's case, was at first practically the same everywhere, namely, that of procuring a milk which was less dangerous for the baby, at first by pasteurizing or sterilizing the product, to destroy all the organisms which might harm the child, and recently and more logically by remedying all conditions which might deteriorate the milk in any way from the second it leaves the cow till it has been fed to the child, in order to obtain a clean raw product which could be used as a food without previous pasteurization or sterilization; this implied tuberculosis-free cows, good sanitary conditions of the animals, stables, milkers, cans, bottles, etc., and the means necessary to cool the milk quickly and keep it below 50°F. and clean till ingested. This milk was sold in large quantities, as quarts or pints, or, and this most frequently, in various qualities and quantities in as many nursing bottles as the child was to have feedings in twenty-four hours. The milk was so distributed through so-called infant-milk-stations (gouttes de lait of the French and Milchkueche of the Germans), which, in some cases, were located in other places of business, such as drug-stores, groceries and the like, or in others had a special set of rooms for their own use, either in conjunction with some general hospital or dispensary or absolutely alone. These stations were mostly in charge of either a maid, who, of course, could do nothing more than distribute the food, or a nurse, who, in most cases, also inquired about the condition of the child and mother, and gave them helpful suggestions and educational literature, or, finally, they were in charge of a physician, who would have the children weighed and would at least make some attempt at adapting the food to the child's special needs. This last is the system in vogue in the Straus Laboratory, in this country, and the gouttes de lait in France, and is, of course, the best of the three mentioned, for it does not, as do the others to a very large degree, allow the mother to use her own judgment, which, to say the least of the best of them, is no good as to quality and quantity of the food for the baby. General formulæ and sizes of individual feedings for certain ages are to be positively condemned, although they are apparently still well liked by some in this country. At an annual meeting of a national association devoted to the helping of the needy, which I attended some months ago, a gentleman from one of our largest cities was quite proudly relating in detail how his city was fighting infant mortality by giving milk pasteurized in nursing bottles and modified for four or five different ages, beginning at birth with so much fat, so much proteid, and so much sugar, in so many ounces, ten to twelve times in twenty-four hours, and then at the sixth week another formula in ten to eight feedings, and so on with two to three more modifications for older children. He and many of the audience who applauded him were much surprised when I took courage to tell him that I did not agree with him on many points. One could much more readily take six men of the same age to a clothing store and fit each man equally well with the same sized suit, than to expect to get the best results in a baby fed in this haphazard way. I do not mean, however, that work done along this line shows no results at all; for without a doubt many lives are saved by simply supplying the babies with "clean" milk in this manner, but nevertheless many more could be saved, and many of the saved show a better state of nutrition and development, mentally and physically, if still other means were adopted, as I shall mention to you later on.

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* Read before the Academy of Medicine of Cleveland, February 20, 1908.

Gradually, as their experience in the fight against infant mortality increased, the various countries adopted different means, which, one has a right to assume, were in their opinion the best of their individual country. Ernö Deutsch, Budapest, in the last *Heft* (1 and 3 of *Band* 47, 1907) of the *Archiv für Kinderheilkunde,* gives a very good résumé of the amount and kind of work done by a number of countries.

France leads by a big margin, having in Paris 28 consultations, 81 dispensaries and 37 gouttes de lait, a total of 146; in the provinces there are further approximately 95 institutions, mainly on the order of the gouttes de lait.

The consultation was started by Budin, in connection with his Maternity Hospital. The object is to see that the mothers, after they leave the hospital, still continue breast-feeding, and only when this is impossible to resort to the *allaitement mixte, i.e.,* part breast and part artificial food, and until absolutely necessary to give nothing but cow's milk.

The gouttes de lait give sterilized milk in either litres, half litres, or in as many nursing bottles as the child is to have feedings, to anybody who comes, rich and poor alike. The different classes pay different prices for the same foods, according to their financial circumstances. Educational pamphlets and personal advice from the physician in charge are also given. In a few instances the gouttes de lait have been combined with other institutions, as the Mutualité Maternelle.

In England, according to Deutsch, there are about twelve milk stations still mainly in charge of laymen. In some parts of the country, where practically all of the mothers nurse their children and the mortality still remained higher than necessary, the office of a "Health Visitor" was established. The duty of this person is to visit the mothers in their homes and teach them intelligent breast-feeding and show them how to improve the hygiene of themselves and the home. A noble idea.

Germany ranks next to France in the number of its institutions, having about sixty Milchkuechen, with or without a Saeuglingsfuersorgestelle, besides having a number of Saeuglingskrankenhaeuser, which last were first inaugurated by Germany just as in the case of the sanatoria for tuberculosis, in contradistinction to France, where the dispensaries originated. The Milchkueche, a simple milk station, is also in some places still in the charge of maids, but is mainly directed by a physician. The Saeuglingsfuersorgestellen of the Schmidt-Gallische-Stiftung in Berlin, which were begun during 1905, and now number five, are very different and much better institutions, to my mind, than any so far described. A very complete report of the Saueglingsfuersorgestelle was written by Japha and Neumann in 1906. The Fuersorgestelle is located in the same building with Neumann's Poliklinik and Krankenhaus for children. Upon entering, old patients pass into a waiting room; the new into an office where their material circumstances are determined; only needy people are accepted. From the waiting room the patients enter the weighing and examining room to receive further advice from the physician, assisted by a nurse who, during the morning hours, visits the patients in their homes to instruct them in the care of the child and its food and also to determine their financial standing. If the patient is ill, he is referred to the Poliklinik in the same building, or if very sick to the Krankenhaus; from both of these places the little patients are again referred, when well, back to the Fuersorgestelle. These three distinct parts, being in the same building and under the general direction of the same man, represent practically one and the same institution and make, to my mind, quite an ideal one; if, however, they were located in different buildings and under different managements, I should call them most unideal. If the child is well, the mother receives her further instructions about nursing and feeding and is told to return at a given interval, usually two weeks. If the child is being fed, the milk, either in bulk or in nursing bottles, according to the capability and means of the mother to modify her food at home, is supplied to them by the milk laboratory of Neumann's hospital at a rate adjusted to their financial circumstances. Often it must be given gratuitously. The main object of the Berliner Saeuglingsfuersorgestellen is to teach the mothers to nurse their children, and this intelligently. With this end in view the physician and nurses both personally and through literature make the best effort possible. In order to stimulate to the highest degree the developments of breast-feeding, which had fallen to 30 per cent., the Schmidt-Gallische-Stiftung decided to give what they call Stillpraemien, *i.e.*, a premium either in the form of milk or money, or both, to the mother who, under the nurse's personal observation, really nurses her child and apparently according to instructions. The money is to be used for the purchase of food for the mother only. And twice per week an hour is spent by a physician in giving advice to needy pregnant women, both medical and social. Furthermore, a course of lectures on the care of babies is regularly given by educated mothers under the direction of Neumann. Not more than five mothers are allowed to attend at one sitting. Finally, an office has been arranged whose force is to assist the mothers in finding homes for their children and to answer and help solve any questions or conditions which might arise in the care of a baby or its mother. A home for needy mothers, who have just been confined and are not able to support themselves properly and at the same time nurse their child, under the management of Dr. Oberwarth, coöperates with Neumann's institution. Schlossmann, while in Dresden, added to his hospital a Waldstation for convalescent babies, during the summer.

In Austria-Hungary there exist to-day about ten institutions, some modelled after the Fuersorgestelle just described, others after the milk stations.

Little Belgium ranks even higher than the just-mentioned country. A most original institution there is the one in Ghent, under the direction of Dr. Miele. He has given a full description of it in Rothschild's *Revue d'Hygiène et de Médecine Infantiles.* It is practically the same institution as the one described in Berlin; a special feature, however, is his school for girls of about fifteen and sixteen years. They at first watch him, and are taught, and then assist him by weighing the babies, taking temperature, etc.

In Ernö Deutsch's résumé it is pitiful to see the record of the work done in America, both North and South, as compared with the countries above mentioned. The Straus laboratory in New York, the Milk Commission in Chicago, the Philadelphia Sterilized Milk and Ice Institution, the Milk Commission in Rochester, the Pittsburg and Allegheny Sterilized, Pasteurized and Modified Milk, Ice and Coal Society, and the work at Yonkers are the ones mentioned. The Boston Floating Hospital, the Junior Sea Breeze in New York, and the St. John's Guild of the same city, are three institutions which ought to have been added to this list. To be sure many cities have, and are now establishing, certified milk commissions, which have made it possible to get a very good raw product at a price which people in medium circumstances might afford. Such is the Canfield certified milk in this city. We also have here in Cleveland a Milk Fund Association which distributes a very good product of milk in the crowded districts of the city at a reduced rate. This institution, together with the Visiting Nurse Association of Cleveland, was responsible for the birth of our Babies' Dispensary. Besides the Babies' Dispensary there is but one other institution which cares for babies, namely, the Children's Fresh Air Camp, which, however, is only available for about three months during the summer.

Now, which of the above-mentioned institutions is the one to be recommended in this work more than any other? If one wishes to exterminate a certain condition he must know, first of all, the various agencies which contribute toward its existence.

Prausnitz, in his chapter on mortality and morbidity in babies in "Pfaundler-Schlossmann's Handbuch," from which Deutsch has taken many of his statistics, covers the ground very thoroughly and gives as proof some statistics and charts, to some of which I should like to call your attention.

CHART I.

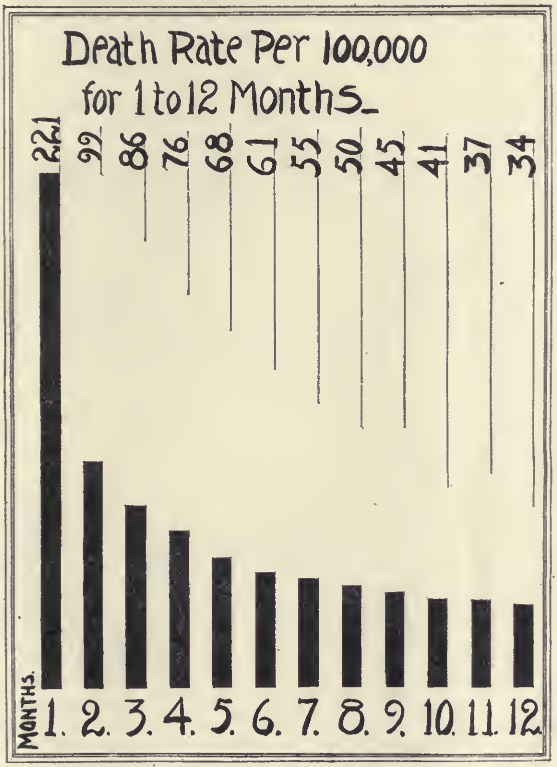
MORTALITY PER 10,000.

Month.	Breast-fed.	Bottle-fed.
1	201	1,120
2	74	588
3	46	497
4	37	465
5	26	370
6	26	311
7	26	277
8	24	241
9	20	213
10	30	191
11	31	168
12	39	147
12	580	4,588

The above chart shows the number of deaths in 10,000 babies on breast milk on the one hand, and cow's milk on the other, during each month of the first year of life. The difference is enormous, the bottle-fed babies dying in four to five times larger numbers than the breast-fed. It also demonstrates that the first month far outranks the following ones in the number perishing.

This is again shown in the following chart of Westergard's.

CHART II.

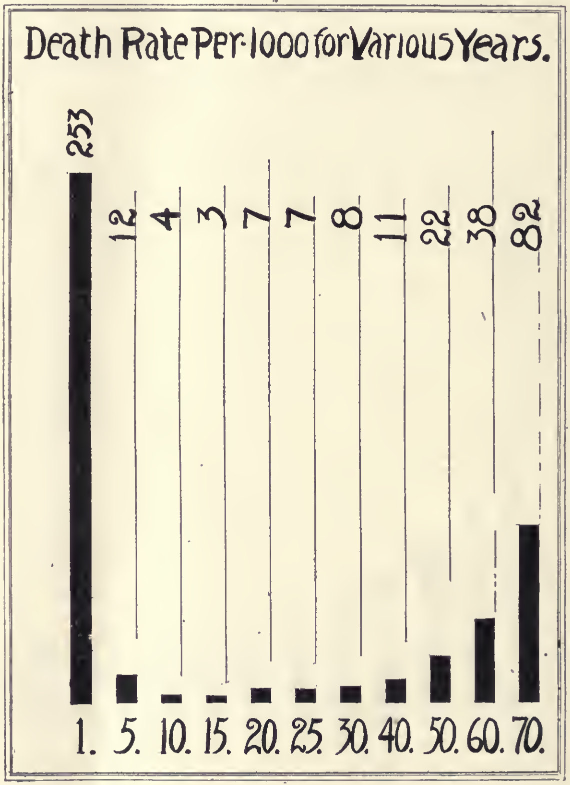


Out of 100,000 one-month-old babies there died daily 221; two months old, 99, etc., till finally 34 for the twelfth month.

That, further, the death rate during the first year of life is much higher than at any time later is proven by the following chart, where, out of 1,000 males one year old, there died 253; five years old, 12, etc., and gradually rising again to about 82 in the seventieth year.

Of course, these statistics are foreign, and some quite old; but a glance at the last report of our local Health Office will show that the total deaths during the first year far outrank those of the following. It reads, for the first year, 1,988; 1-5, 630; 10-20, 298; 20-30, 676; 30-40, 738; 40-50, 659; 50-60, 709; 60-70, 761, and 70 and over, 1,014.

CHART III.



That the season of the year plays an important part is well known to all of us—I mean the high death rate during the summer months, due mainly to diseases of the intestinal tract. We know that under favorable circumstances, as they surely are present during the summer in large cities, the bacteria in milk will develop enormously and thereby make the food a means of infection to the baby, with very disastrous results.

Another very instructive statistic which I have not reproduced was prepared by Prausnitz, namely, that of determining the mortality rate amongst the babies divided into the four classes of (1) the rich, (2) the middle class, (3) the needy, and (4) the poor, according to the means of their parents. He collected the number of deaths under one year with gastrointestinal diseases in five different cities, from 1895 to 1899, and found the conditions practically the same in every city. The average result was .28 per cent. for the rich, 6.58 per cent. for the middle class, 36.46 per cent. for the needy and 52.66 per cent. for the poor. The poorer the family, the worse the condition of the home is true in *most* cases, and that is what this statistic tells me.

From the last report of the Cleveland Health Office, which was courteously given me, it can be ascertained that Cleveland is no different in this respect. In the twenty-six wards 578 children under two years died with gastrointestinal diseases, and 166, or 28.71 per cent., of these in the thirteenth, fifteenth and seventeenth wards, which represent the most densely populated part of our city.

That Cleveland is also behind some much larger American cities can be seen from a comparison of the death rate from all causes under one year in New York and here, which is represented in the following:—

CHART IV.

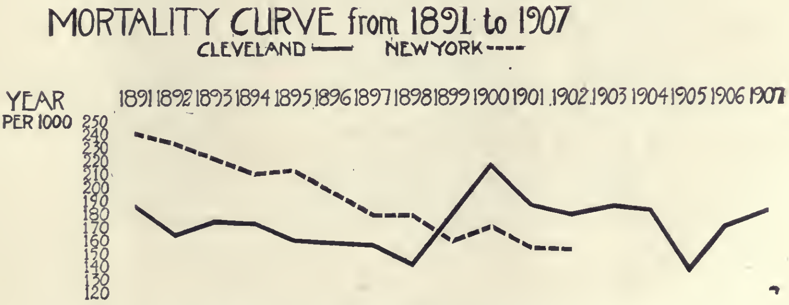
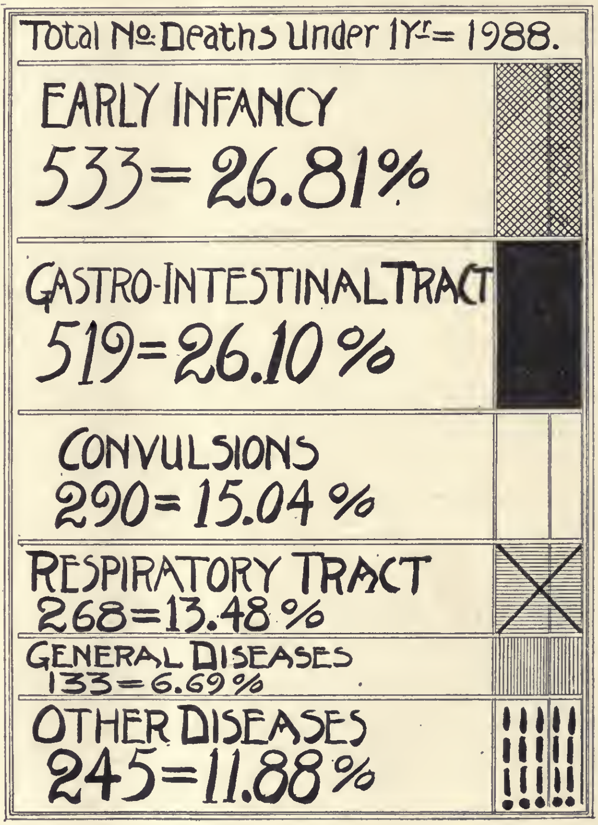


CHART IV.—The dot in lower right hand corner shows mortality at Babies' Dispensary of Cleveland for eighteen months.

The sudden rise of the curve from 1899 on is, in all probability, due to marked increase in immigration, which began at about that time.

Chart V. also refers to local conditions and represents them as found in the health report of this city for 1907. This chart alone proves to me that if we expect to lower the death rate amongst infants to the lowest possible level, and hope to do this by simply bettering our milk supply, or even supplying the poor with modified milk in feeding bottles, we shall not succeed, even though it should be possible to have not more than a few hundred bacteria per c.c. in the milk. Czerny, at the meeting of the German Pediatric Society in Dresden during last September, stated that to him the milk stations—meaning such stations as simply supply good milk *without going into the individual case sociologically and medically for a longer space*

CHART V.



of time—proved nothing more than the fact that infants could be fed on clean cow's milk. He has, of course, taken a position which can be justly called extreme. But he calls very vividly to our attention the fact that you cannot judge a baby's welfare simply by his stools and weight chart. Finkelstein, in his classical study and description of "Alimentaere Intoxication" in the *Jahrbuch für Kinderheilkunde,* proves beyond a doubt that a perfectly clean milk can very often, under certain disturbed conditions of nutrition, send a child into collapse and death, as he himself admits having done quite frequently, but, of course, unconsciously, in the past. This is not the place and time to describe Finkelstein's "Alimentaere Intoxication," but I do wish to state briefly the symptoms of this condition to show you what severe changes in the metabolism can be brought about by giving sugars and fats even in the form of clean milk at a wrong time: (1) Disturbance of consciousness; (2) change of the normal type of respiration to that resembling that in coma; (3) alimentary glycosuria, *i.e.*, lactosuria; (4) fever or subnormal temperature; (5) collapse; (6) diarrhea; (7) albuminuria and cylindruria; (8) marked loss of weight, and (9) leukocytosis.

From the last chart (V.), to which I should like to again call your attention, one is informed that of the 1,988 infants under one year who died here during 1907, 519, or 26.1 per cent., have died as a result of gastrointestinal disease; 583, or 26.81 per cent., have died in early infancy; 290, or 15.04 per cent., in convulsions; 268, or 13.48 per cent., with diseases of the respiratory tract; 133 with general diseases (6.69 per cent.), and the remainder from other conditions. Now, if you take it for granted that we could save all the lives which were lost through gastrointestinal diseases, namely, 519, we would then still have 1,469 under the first year left, with a rate of 136.7 per 1,000; *still a high figure!* That the saving of all 519 might be possible if good milk were supplied, could hardly be claimed by the wildest enthusiast; for before you could get the biggest possible results from your clean milk, you would have to teach the mothers how to keep it wholesome, and this cannot be done by simply giving a few pamphlets and having the person who distributes the milk ask in general terms about the condition of the patient and give directions accordingly. Then we now know, further, that a very large percentage of those dead with convulsions belong under the heading of Finkelstein's "Spasmophilic Diathesis," which occurs most often in bottle-fed children, whether fed with clean or dirty milk. Furthermore, we are aware that many children in the pneumonia and bronchitis list have acquired the disease by being predisposed by some nutritional disease, such as rickets or exudative diathesis. And then, finally, the 533 who have died in early infancy. Under this heading, I take it, are included cases of congenital lues; but, more than these, the premature babies and weaklings and others, though normal when born, who simply die for want of care and the breast, and not necessarily because they got bad cow's milk. If one were given a chance to get these children right at birth, I am sure a distinct change could be brought about in this list.

These various statistics and facts tell me the following things: (1) That it is the month-old, poorly-situated, neglected, bottle-fed babies, especially during the summer months, that make up the bulk of our deaths under one year; (2) that to overcome this we must get for the babies, first of all, not clean cow's milk, but what they ought to get, and can get, in 80 to 90 per cent. of the cases, namely, their own mother's breast milk; (3) that to be successful in this we must begin early, that is, at the birth of the child or, better still, before the child is born, by instructing and caring for the needy mothers-to-be, as is done in France and Germany. This field really belongs to the obstetricians, and it is their duty to awaken to it; (4) to see that clean cow's milk is produced for those cases who cannot get breast milk for some valid reason, and, further, for those who are fed by *allaitement mixte* and, finally, for those who have been weaned; (5) that in every case the object should be to practice preventive medicine—prophylaxis—by education in the home by individuals who have had the necessary training to do it satisfactorily, and with the necessary training—I mean those who have had both medical and social work, namely, the *Visiting Nurses;* (6) that the work be directed from some central institution, namely, a dispensary, and that this dispensary be under direct medical supervision.

The institution of those previously described best adapted for this work, seems to me to be the Berliner Fuersorgestelle, as described by Japha and Neumann. It combines the work of the French consultations and gouttes de lait and, in addition, makes use of the visiting nurses for the home work, which last must put them on a higher plane in the opinion of any one doing social work. Of course, it is not necessary that every single feature of this institution must be accepted, for various countries, and in these countries various cities, have different needs and according to which they must model their dispensary.

An ideal institution to me ought to comprise the following parts:—

(1) A dispensary, both for sociological and medical work, where mothers could bring their healthy babies soon after birth, and their ill ones as well, where also the visiting nurse would come to get the instructions from the physicians, and where she could note her work in the records kept at the dispensary; where girls, maids, students, nurses and physicians could acquire the necessary training in this work. The dispensary itself ought to have an office where the records could be kept; where the one in charge could determine immediately, in many cases, whether the case is worthy or not, and through which all co-operation with various institutions could be effected, and many problems, such as finding mothers for babies and homes for both, could be solved. Then a waiting room, a weighing room, a number of examining rooms, one arranged for minor surgery, and about three isolation rooms. It would be well to have in this building also a large lecture room for mothers, nursery maids and students, and a clinical laboratory.

(2) A milk laboratory, where clean milk is bottled in pints or quarts; or, if the mother cannot, for some valid reason, modify the food at home, under the nurse's direction, in nursing bottles according to the formula prescribed by the physician; and where the food could be pasteurized or sterilized if deemed necessary.

(3) A hospital for babies too ill to be cared for in the dispensary or home, with chemical, clinical and pathological laboratories; where nurses, nursery maids, physicians and students can get their training in this work, and where also new problems in this specialty might be solved.

(4) An isolation house for contagious diseases.

(5) Branch dispensaries on a smaller scale in the crowded districts on the outskirts of the city, which would have their milk supplied by the central institution, and which would send their ill cases to the central hospital.

(6) Convalescent homes and fresh-air camps in the country or suburbs, especially during the summer.

This institution would co-operate with any individual or association which might benefit the *child or its home.*

The local Babies' Dispensary has not been able in the short time of its existence, since July, 1906, to obtain the above mentioned complex; but it is nevertheless moved by the same spirit. We have at present a dispensary, a milk laboratory and an emergency hospital room, which last is, for various reasons, of little value to us; a staff of four visiting nurses, who give us their entire time, and six physicians, interested in both the medical and social side.

The dispensary comprises a clerk's room, an isolation room, a waiting room, two examining rooms, a small bath room, and a simple clinical laboratory.

The milk laboratory consists of a room for cleaning and sterilizing the bottles, and another for the modification of the milk. The milk used is from tuberculin-tested cows and has a low bacteriological count, during the last summer not reaching above 10,000 per c.c. In the laboratory the milk is modified for those people who cannot, either because of the condition of the home, or the time of the year, or because of utter ignorance, or too much work, modify their milk at home. *The larger the attendance in the dispensary and the smaller the amount of milk sent out by the laboratory, the better the work of the force must be, for it proves that many of the babies must be getting breast milk.* During the summer the milk is pasteurized, otherwise not. Patients living in districts out of the reach of our laboratory are supplied in practically all cases with Canfield's certified milk, which they modify at home according to the doctor's directions and under the supervision of the nurse. Those who cannot be trusted with their own modifications receive the milk modified and delivered to them by us through the Walker-Gordon laboratory. The patients are charged for the food according to the financial circumstances. Those who are absolutely poor receive it for nothing. For each case in the laboratory a separate milk record is kept, and also a separate monthly record for the different firms or laboratories who might deliver or supply milk for us. The patients must get their tickets in advance; this has saved us much time which was at first spent in collecting the small accounts.

The patient first enters the clerk's room, where his name is recorded on the index card, where he receives an admittance card in his own language—if he speaks either English, German, Italian, Slovak or Yiddish—on which is written his name, address, date of entry, and the number of the medical chart, which is always the next running number.

Date.................... No. ....

DIET SLIP.

Nurse }
Feed } child every .... hours or ....

.................times in twenty-four hours; or at

following hours ....

At Each Feeding Give

Breast .... minutes

Food .... oz. (gm.)

To Prepare Food Take:

Sugar .... oz. (teaspoonful) (gm.)

Cow's Milk .... oz. (gm.)

Boiled Water .... oz. (gm.)

Oatmeal Water .... oz. (gm.)

Tea .... oz. (gm.)

Whey .... oz. (gm.)

Cream .... oz. (gm.)

Skimmed Milk .... oz. (gm.)

Keller's Malt Soup .... oz. (gm.)

Buttermilk .... oz. (gm.)

....

....

....

Always bring this slip with you.

Return in .... days

Read the directions given you by the doctor, how to prepare the baby's food.

If, upon the question of the clerk, the patient has a symptom which might suggest a contagious disease, he is hurried off to a small room which is used only for isolation. If no contagion is present he passes into the waiting room, where he is weighed and where his temperature is taken by the nurse in charge. Then he passes into the examining room, where the physician first takes an accurate history, especially as to the quality and quantity of his feeding since birth. Then he is examined and the findings entered on his chart. According to his condition, his mother receives personal advice from the physician, both medical and sociological, the latter more at the second visit, before which the nurse has, as a rule, investigated the home conditions personally. As it takes much time to tell any mother, but especially those of foreign tongue, how you wish them to nurse or feed their little ones, we have devised what we call a diet slip (see preceding page), upon which can plainly be designated how much, for how long, and when the child is to be fed or nursed, and also how the food is to be prepared.

These slips are also printed in five languages, and each word is exactly in the same place on all five slips, so that anyone who has the English slip can, by comparison, find out what that mother is supposed to do, although she may have an Italian slip to show you. This is made use of by our nurses in the homes when they wish to know if and how the mothers have been carrying out instructions. Then, further, we have the directions for the preparation of the various foods also printed in the same five languages and in the same way. Before the mother leaves the examining room she receives from the physician, in an envelope, an educational booklet in one of the five languages, which tells her our object, also useful suggestions about nursing, feeding, and the care of children ill with gastrointestinal diseases. On the last page we have a weight chart, where, at each visit, the weight is entered. This is done to keep the parents interested and to force them to keep the booklet longer than they otherwise might do, hoping that it will be in this way more often read. Besides, each one receives a small educational leaflet with a few fundamental rules, also in five languages. At every further visit the physician is always expected to consider both the social and the medical side of the case, and not simply to consider himself a dispenser of either breast or cow's milk, or simply a diagnostician. If a child is too ill to go the dispensary and will not go to the hospital, it is now visited by our out-physician, who has had an excellent training in babies' diseases.

On the following day, if it is possible, and the case a new one, the visiting nurse of the Babies' Dispensary in whose district the patient happens to be visits the house, first of all, to determine the financial standing of the family and to decide whether they are worthy or not. A worthy patient is one who cannot afford to pay for the advice of a regular physician. This term "worthy" can, it is true, be stretched one way or the other a good deal if so desired, but later on I shall try to show you some figures which will demonstrate to you what can be accomplished if a nurse knows her duty. Then the nurse demonstrates to the mother how to carry out the physician's instructions and gives her advice which might not only refer to the child but also to the entire home. *And here the visiting nurse of a modern Babies' Dispensary has, in my opinion, a by far greater opportunity for doing real prophylactic work than anyone else.* She visits these homes, even though the child be breast-fed and well, once every two weeks, and at least once every month. In this way she gets into the homes more often than any other social worker because she cares for babies who are in most cases constantly present in the families, and because she enters not only when they are ill, but also when they are well; so in this manner she sees more of the remainder of the family, and if she makes use of her eyes and ears she can quite often refer other family members to various institutions long before they would have gone of their own accord.

During the summer we supply the real poor patients with small ice boxes. The Associated Charities sends the ice. To this association we also send those of our mothers who are too poor to buy enough food for themselves to enable them to keep the child at the breast. In this manner we do the same as is done in France and Germany, except that we do it through another organization.

We limit the age of the patient to three years. During the first twelve to fifteen months the baby is expected to be brought regularly once every two weeks when well, and as often as necessary when ill. When he is well and on the regular diet for the second year, he is discharged, and asked to return at the age of two years to again be examined, both to give us an opportunity to see our results and also to direct the feeding for the third year. The French and German institutions stop abruptly at twelve to fifteen months. To my knowledge there exists no other institution which follows the same plan as we do in this respect.

How much can be accomplished in the reduction of infantile mortality is shown by Chart VI., which represents the results obtained during a space of five years by Dr. Miele in Ghent. With every year the attendance has increased; the death rate has decreased; the regulars have outnumbered the irregulars, and those entering as slightly ill or well are more numerous than those entering gravely ill.

CHART VI.

	NOMBRE DE NOURRISSONS (en dessous de 15 mois) INSCRITS			ENTERITES Observées au début			AUTRES AFFECTIONS que l'entérite.			ETAT INITAL			MORTALITE MOYENNE. Parmi les reguliers.	PROPORTION des NOURRISSONS élevés au sein ches les Indigènes.
				Parmi les.			Cas parmi les							
	Réguliers.	Irréguliers.	TOTAL.	Réguliers.	Irréguliers.	DÉCÉS.	Réguliers.	Irréguliers.	DECES.	GRAVE.	Enfants délicats.	Enfants sains.		
1901 : 2e Semestre	92	92	184	57	22	24%	35	70	34%	112	61	1	27%	11%
1902 1r sem.	65	112	177	49	47	16%	16	65	25%	112	58	7	18%	16%
2e sem.	155	130	285	111	75	14%	44	55	9%	150	118	17	12%	14%
1903 1r sem.	228	224	452	152	109	8%	76	115	5%	93	324	35	8%	15%
2e sem.	189	255	444	147	154	8%	42	101	9%	77	326	41	8%	16%
1904 1r sem.	213	214	427	154	77	9%	59	137	13%	93	289	45	10%	18%
2e sem.	194	253	447	123	149	5%	71	104	7%	68	378	61	5%	18%
1905	583	389	972	277	195	2%	306	194	6%	101	736	135	4%	34%
1906'	492	348	840							144	362	334	3%	18%

During the nineteen and one-half months to February 12, 1908, we have had 770 patients. In these nineteen and one-half months are included two full summers. The results of our work can be ascertained from the following Chart VII.

Our total death rate is 12.5%; that of the entire city for 1907 18.5% for those under one year. (See Chart IV.) Of the total 12.5%, 2.87% died in our care and 9.6% in outside care. In "under our care" are included first all those cases who died while being cared for by us personally, and, secondly, those who died in the care of another physician or institution to whom we sent the patient, but who had been cared for by us longer than by the following institution or person, so that we really had more chance to cure the child than the second party.

Under the head of "in outside care" are counted first those who with or without our knowledge entered the care of other physicians or institutions who had more opportunity to save the child than we had had; and, secondly, even those who had some time or other, regularly or irregularly, attended our dispensary, and who had without our knowledge become ill, entered the care of some person or institution and died there. The information of their deaths was either obtained by our visiting nurse or through some co-operating institution. In this manner we can ascertain practically all of the deaths of patients who have attended our dispensary as long as six months previous. It is very important to remember this when comparing our results with those of other cities, for only too often are low mortality percentages obtained by neglecting to follow the cases long enough.

CHART VII.

-MORTALITY STATISTICS-

Nº Patients 770. Nº Deaths 97= (12.5%)	Regular	Irregular	Seen ½ times	Age to 1 year	Age above 1 year	Intestinal Diseases	Other Diseases	Entered Normal	Entered Slightly Ill	Entered Mediumly Ill	Entered Gravely Ill	In Our Care 1 Week	In Our Care 1+ Week	Nº Dead in Our Care 22(2.87%)	Nº Dead in Outside Care 75(9.62%)	Total Nº Prophylactic Cases-77.	
																Died in Our Care	Died in Out-Side Care.
Breast-fed 10=(1.30)%	5- 50 %	1- 10 %	4- 40 %	9- 90 %	1- 10 %	4- 40 %	6- 60 %	2- 20 %		2- 20 %	6- 60 %	5- 50 %	5- 50 %	-3- 0.38 %	7- 0.90 %	0= %	3= 3.8 %
Bottle-fed 80=(10,38%)	15- 18.74 %	16- 20 %	49- 61.25 %	70- 87.5 %	10- 12.5 %	48- 60 %	32- 40 %	5- 6.25 %	6- 7.5 %	12- 15 %	57- 71.25 %	56- 70 %	24- 30 %	16- 2.07 %	64- 8.31 %		
Mixed 6=(0.77%)	2- 33.3 %	2- 33.3 %	2- 33.3 %	5- 83.3 %	1- 16.6 %	2- 33.3 %	4- 66.6 %		3- 50 %	1- 16.6 %	2- 33.3 %	1- 16.6 %	5- 83.3 %	2- 0.15 %	4- 0.52 %		
Weaned 1-(0.12%)		1- 100. %		1- 100. %			1 100. %				1- 100. %		1- 100. %	1- 0.12 %			

I do not believe that I am claiming too much when I state that the 9.6 per cent. could have been reduced a fair degree if we had had a large, modernly equipped Babies' Hospital at our disposal in order to have cared for more personally. I doubt very much, however, if it would be possible to lower the rate to 2.87 per cent—the present percentage of those dead in our care—for

I fully realize that some of those which were sent to other institutions by us, and died there, would also have died in our care.

The mortality statistics plainly demonstrate that it is the bottle-fed baby under one year that made up the bulk of our deaths, and that among these the intestinal disturbances were the most frequent cause; further, that about 70 per cent. of these entered gravely ill and were seen but once or twice by us.

Very instructive is the column relating to the death rate among our prophylactic cases, which show how much can be accomplished if one can get the child when it is still normal and young. Our prophylactic cases are babies who were normal. either breast- or bottle-fed, and whose mothers came to be instructed in nursing and feeding. Of the total 77 to date 3 have died—all in outside care and without our knowledge. One had cerebrospinal meningitis, another had been at the dispensary but once during March, 1907, and had died from some unknown cause during August, 1907, in the care of an outside physician; the third was a perfectly normal breast-fed baby, whose mother suddenly became insane and was sent to the State Hospital. The child was left in the care of dirty neighbors, where in a few days it contracted a serious intestinal infection and died in another institution.

In conclusion I wish to call your attention to the following Chart VIII., which treats of the number of patients discharged for good financial circumstances, as determined by the nurse in the home and at the regular bi-monthly meeting of the nurse with the director of the dispensary.

Of the 770 patients, there have been discharged because they could afford to have their private physicians, 133, or 17.2%. I have often heard the remark made that many of the patients attending various dispensaries could well afford to employ a family doctor. That this is true is, I believe, very plainly demonstrated by these statistics.

CHART VIII.

Number of patients discharged for good material circumstances, 133, or 17.2 per cent. of 770 patients.

Of these:—

At first visit, 68, or 51.12 per cent.
" second " 39, " 29.32 " "
" third " 11, " 8.25 " "
" fourth " 15, " 11.24 " "

I firmly believe that the work done at institutions of the type of dispensaries in general ought to be limited to the needy people, and to them alone, in contradistinction to the Gouttes de lait of the French, where everybody is admitted, and to some of the Saeuglingsfuersorgestellen in Germany, where at present there seems to be a misunderstanding between these institutions and the practitioner. Salge, in defending the Fuersorge, says that these well babies would, even though their parents could afford it, not go to a physician for prophylactic advice, therefore he would not suffer by it. The practitioner, however, claims that if the child should get ill he would not have charge of the case as he would have had otherwise. I believe each has a good argument on his side. We have limited our patients to needy families and combined the social dispensary with the medical, not only for one year, but for three years. The way we hope to reach the middle class is by means of public lectures, literature and exhibits, and also through the physicians themselves, who will have, through the erection of dispensaries and hospitals devoted to babies' diseases, better opportunities to acquire a training in the work so important for the family doctor, and finally, also, through nursery maids, a school for whom ought to be connected with such an institution.

But the Babies' Dispensary and Hospital ought not to be the sole institution which admits only needy patients. It should, rather, be done by every dispensary in a community. Then the private practitioners would get the patients who belong to them, and, on the other hand, I believe the physicians would show their appreciation and send the needy cases to the dispensaries.

NOTE—Those interested may obtain report of the hospital and other literature referred to in this article by writing to the author.

THE TREATMENT OF PAPILLOMATA OF THE LARYNX IN CHILDREN.—Von Zuppinger (*Ber. der Ges. für inn. Med. und Kinderhk. in Wien.*, 1907, Beil. XI.) recommends the endolaryngeal method by means of Lori's catheter, and formulates the following rule for treatment: Laryngotomy and tracheotomy without endolaryngeal measures are to be rejected. In emergencies, intubation is given the preference over tracheotomy. On the other hand, if there is no accompanying stenosis present, the simplest surgical procedure should be employed, such as Lori's catheter.—*Der Kinderarzt,* November, 1907.

DENTAL CARIES AS A CAUSE OF DISEASE IN CHILDREN.—PREVENTIVE MEASURES.—DENTAL CLINICS.*

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In a recent paper Osler says: "If I were asked to say whether more physical deterioration was produced by alcohol or by defective teeth, I should unhesitatingly say defective teeth."

The American dentist has always held a high place in his specialty. Perhaps it is partly on that account that the American physician has given so little attention to the teeth. Certain it is, that as a possible cause of other diseases of the body they have been very much neglected.

In 1891 Miller tabulated 149 cases in which serious complications resulted from diseased teeth, many of them ending fatally. This was seventeen years ago, and the list was admittedly incomplete.

In rickets, syphilis and tuberculosis we have examples of constitutional diseases which may cause characteristic changes in the teeth. Scurvy, diabetes and leukemia frequently present characteristic changes in the mouth. These and many oral diseases could be advantageously studied by the physician and dentist together. Such a combined study would probably yield valuable results.

In the analyses of constitutional diseases associated with oral changes, it is important not to confuse cause and effect. These changes may be primary, but more frequently they simply represent one manifestation of the constitutional condition.

Diseases which may result from an abnormal condition of the teeth:—

(1) Diseases of the tooth itself.

(2) Diseases of adjacent structures, gingivitis, pyorrhea alveolaris, alveolar abscess, periostitis, ostitis, necrosis.

(3) Different forms of stomatitis, including ulcerative and gangrenous stomatits. Tonsillitis.

(4) Diseases of the maxillary sinuses.

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* Read before the Society of Medical Inspectors of New York, April 8, 1908.

(5) Diseases of the cervical lymph nodes. Cellulitis (Ludwig's angina).

(6) Diseases of the alimentary tract.

(7) General infections. Septicemia. Pyemia.

(8) Diseases of the blood. Disturbances of nutrition. Nervous diseases.

I shall discuss briefly only a few of these, which are of special interest to the pediatrist.

It is remarkable that the presence of carious teeth as a factor in the causation of stomatitis has been so little emphasized. Ulcerative stomatitis does not occur where there are no teeth, namely, in early infancy and old age. The process usually begins as a gingivitis around a carious tooth, then spreads to the adjacent buccal mucous membrane. Carious teeth alone are not sufficient, for many persons have decayed teeth without stomatitis. But given certain, as yet unknown, physiological changes in the tissues and the specific microorganisms penetrate and multiply. The lowered vitality of the tissue is an essential factor. When the ulcerative lesions occur on the tonsils they are of the same character. In all probability the specific organisms are carried to the tonsils in the act of swallowing. They become lodged in the deep crypts, and there find the conditions favorable for their growth.

The Cervical Lymph Nodes.—Odenthal examined 987 children, between the ages of three and twelve, and found that 70.7 per cent. had enlarged cervical nodes. Of 267 who had no enlargement only 5 had caries. Starck found 80 per cent. with enlarged nodes. Between six and nine years they were seldom absent. In 41 per cent. of those with enlarged nodes no other cause except caries was found.

For the purpose of this study the cervical lymph nodes may be divided into three sets:—

(1) Those along the posterior border of the sternomastoid muscle, which drain the lymphatics from the posterior portion of the head and the nasopharynx.

(2) Those around the angle of the jaw, which drain the tonsillar and pharyngeal region.

(3) The submaxillary and submental, which drain the region of the tongue, lips and jaw.

Most of the writers who have discussed the relation of carious teeth to the enlargement of these nodes have not indicated clearly which set they found enlarged. For our purpose the nodes along the sternomastoid muscle and those at the angle of the jaw may be disregarded since their enlargement is due almost exclusively to infections of the tonsils, pharynx and nasopharynx. During the past six months I have examined 1,200 children between the ages of five and eleven with special reference to this point. In over 95 per cent. the submaxillary nodes were palpably enlarged. If the head is flexed on the chest they may be readily felt, varying in size from a pea to an almond. The most common situation is about one inch anterior to the angle of the jaw, just outside below or inside the body of the jaw. Sometimes only one is felt; more frequently two or more.

There are but two processes which are so constant that they could cause an enlargement of the nodes in such a large percentage of cases, namely, dentition and dental caries, with its associated conditions. In every case of dental caries I found these nodes palpable. In a very small percentage of cases they were enlarged without any apparent cause, but it must be remembered that these nodes may remain enlarged long after the source of infection has disappeared. It is possible that the hyperemia and slight injury to the gums at the time of the eruption of the teeth may be sufficient to cause such an enlargement. The nodes are more distinctly palpable in those cases in which the edge of the tooth is carious, so that a slight gingivitis is produced by contact with the gum. The absorption by the lymphatics takes place *not* from the cavity of the tooth, but from the mucous membrane.

Digestive Disturbances.—Carious teeth and painful gums mean imperfect mastication. The food is not thoroughly chewed and mixed with saliva. The first, and a very important, part of the digestive process is improperly performed. As a result of insufficient action of the muscles of the jaw, the normal flow of blood and lymph to the parts is diminished and their development impaired. Particles of food remain lodged in the carious teeth, and decomposition takes place. The microorganisms of putrefaction grow and multiply, and these, together with their products, are swallowed and may cause digestive disturbances. However, this has not been conclusively proved. It is possible that the gastric and intestinal secretions render them harmless, when they are not in too great number.

General Infections.—A number of well authenticated cases of septicemia and pyemia, with the primary focus of infection around a diseased tooth, have been reported by Miller, Hunter, Godlee, Owen and others.

In the future all such cases will probably be more carefully studied from a bacteriological standpoint, blood cultures made, and the identity of the organism found in the blood and mouth demonstrated. The subject is certainly an extremely important one and deserves careful study by the physician and dentist.

Diseases of the Blood.—Malnutrition.—The strongest advocate of pathological conditions of the teeth as a cause of anemia is Hunter. He believes that even certain cases of pernicious anemia are due to a chronic infection from the gastrointestinal tract which has its origin in diseased teeth (oral sepsis).

Imperfect mastication, with imperfect digestion and assimilation, lead to malnutrition and anemia. Wallis investigated this subject in one of the English schools. He says: "I found that in the vast majority of cases those who had the worst teeth showed a proportionately bad physical development"; and, "In nearly every case these children were below the average in mentality." Though few will doubt the truth of these statements, it is questionable whether the relation is entirely one of cause and effect. Many other factors must be considered. Children with carious teeth and unsanitary mouths are more likely to belong to the poorer parents. These children are more apt to have insufficient food improperly cooked, and more likely to live under unhygienic conditions in small, imperfectly ventilated rooms. Again, the parents would be more ignorant and the children less intelligent by reason of their inheritance and home training. In order to determine with something like scientific accuracy what effect carious teeth and unhealthy mouths have upon the production of anemia and mental and physical backwardness, a group of children having marked dental caries and malnutrition should be chosen. They should be weighed, measured and the percentage of hemoglobin determined twice with an interval of say two months, in order to obtain an accurate idea of their development and rate of growth. The mouth should then be put in a thoroughly healthy condition without any change being made in the diet or mode of life, and after the lapse of two or more months another determination of the size, weight and hemoglobin made.

Nervous Diseases, Neuralgia, Headache, Tics, Epilepsy, Neuritis.—I should like to mention briefly two points: The habit of drawing air through a carious tooth, in order to dislodge particles of food, may be the starting point for a tic. Several writers have claimed a relation between dental caries and epileptic attacks. Wallis noted the number of attacks in the inmates of an English asylum. The teeth of these patients were then put in perfect condition. There was no marked diminution in the number of the attacks. Such an experiment shows the importance of caution in drawing conclusions.

The Relation of the Teeth to Tuberculosis.—The prevention and cure of tuberculosis is, to a great extent, a question of nutrition. Proper nutrition is impossible without proper digestion and assimilation, which, in their turn, are largely dependent on thorough mastication.

At no time is the food factor so important as in infancy and childhood.

Tuberculous Cervical Adenitis.—Can the tubercle bacillus by gaining entrance to a carious tooth reach the adjoining lymph nodes? By many writers this is considered a frequent occurrence. However, a study of the literature shows that this is comparatively rare. Partsch, in reporting a case in 1904, reviews those previously reported, and concludes that they are all more or less doubtful. Starck reported 5 cases, 3 of which he himself considered only probable, the remaining two Partsch does not accept. According to the latter, two points are essential: (1) The proof that the node primarily affected received its lymphatic supply from the diseased tooth, and (2) the destruction of the tooth pulp. It must be remembered that tubercle bacilli are rarely found in the cavities of carious teeth in cases of pulmonary tuberculosis, although the sputum may contain them in abundance. This is explained by the fact that other organisms are present in so much larger numbers that they use up all the available nutritive material, the tubercle bacillus being, so to speak, starved out. Besides, the tooth pulp has no direct lymphatic connection with the adjoining lymph nodes. With the most improved technique Stahr and Ollendorff failed to demonstrate such a connection.

The possibility of tuberculous infection by way of the teeth requires further study. Westenhoeffer believes the infection frequently takes place through slight injuries to the gums, which occur at the time of dentition. It is also interesting and important to remember that, according to Czerny, the submaxillary and submental nodes are more frequently the site of tuberculous changes than any of the other cervical nodes.

Relation to Infectious Diseases.—Just how much the presence of carious teeth and an unhealthy mouth predispose to the infectious diseases it is difficult to determine. It would be important to investigate whether the tubercle, the diphtheria and the influenza bacilli, the pneumococcus and the meningococcus are found more frequently in such mouths, and whether they find there conditions favorable for their growth. It is often assumed that they do. But we have already mentioned that for the tubercle bacillus this is extremely doubtful.

It is a matter of daily observation that the presence of carious teeth and the neglect of the mouth during the infectious diseases often lead to disagreeable forms of stomatitis. The lowered vitality of the tissues probably plays an important part. A slight injury or abrasion of the mucous membrane caused by carious teeth may serve as a point of entrance of infectious material, including that of the exanthemata.

Percentage of School Children Having Dental Caries.—This is given by various authors as from 70 to 95 per cent. During the last six months I have examined 1,200 school children between the ages of five and eleven. The majority of these were not of the poorer class, so that the results obtained are favorable. Only caries which was visible during the ordinary inspection of the mouth is included, no mirror or probe being used. Examined in this way, dental caries was present in 72 per cent. No marked difference was noted in the sexes. The highest percentage was found in children between seven and eight years. However, in judging the amount of change from the normal, we must add the number of teeth lost to the number of carious teeth.

Statistics based upon such an investigation have been compiled by English authorities. They show that as the children grow older there is a progressive diminution in the percentage of children having a sound set of teeth.

Age	4-6	7-9	10-12	13-15	16-18
Number examined	744	1,716	3,071	2,376	268
Defect temporary only	67.4	43.3	18.3	5.1	0.1
Defect permanent, 1-4	8.8	41.5	55.9	51.9	37.3
" " 5-8	—	1.9	8.5	22.9	32.6
" " 9 or more	—	—	1.2	6.0	23.6
Sound, no decay	23.8	14.2	16.1	14.1	6.4

In the examination of these children (between the ages of five and eleven) I have been struck by the rarity of fillings. Certainly many teeth extracted might be saved. I appreciate the fact that the parents often object to the expense, and the dentist may be forced to extract against his better judgment, but I think all will agree that more conservatism is indicated. In some instances children with carious teeth have gone to a dentist and have been told that there was no use doing anything as the teeth would fall out anyway. I believe the best dentists do *something*—filling if possible, extraction if necessary.

In order to get an idea of the percentage of children who take regular care of the teeth, I questioned 1,446 children between the ages of eight and fifteen. Of these, 236 brushed the teeth regularly twice a day, 602 once a day; the remaining 608 did not brush the teeth at all.

It must be remembered that these children were not of the poorest. The results are a little too favorable, but taken as they stand they show that 42 per cent. neglected the care of the teeth altogether. The results also show that the older children are more careful than the younger, and especially the older girls more careful than the older boys. Of the total number not 5 per cent. received regular dental treatment.

Much time is needlessly lost by absence on account of toothache or diseases resulting from the teeth. On inquiry, I found that among 1,030 pupils, during a term of 100 school days, 157 had been absent from one-half to fifteen days, with a total of 205 days lost. Much more was lost by the younger children.

Preventive Measures.—It has been said that "The prevention of dental disease in children is a better study than its treatment." The health of the mother during pregnancy and lactation should receive due consideration. The infant should be given the breast if possible. If this cannot be obtained, mixed feeding or carefully regulated bottle feeding. The effect of improper feeding on the teeth is well illustrated in the case of rickets. Older children should receive a carefully selected diet, including food which requires thorough mastication. The fine American flour has been held accountable for much of the increase in dental caries. From the *age of three* the teeth should be examined every six months and treated if necessary. Attention to the temporary teeth insures good permanent ones properly placed. If there is nasal obstruction this should be corrected. The teeth should be brushed night and morning, all surfaces being included, with especial attention to the molars. The mouth should be washed out after each meal and the particles of food removed.

If a cavity has formed it should be filled immediately, not waiting until the tooth becomes painful. Such prophylactic measures would be much more frequently carried out if school children were given a little elementary instruction in the hygiene of the mouth.* Such instruction can be made more interesting and intelligible by the use of illustrated charts. (Jessen.)

In a few classes in which the teachers were giving such instruction, I found that the percentage of pupils who were brushing the teeth regularly was *far* above the average.

Dental Clinics.—America has the honor of having founded the first college of dentistry in the world (at Baltimore in 1839). But in the establishment of dental clinics for children we are far behind. Germany has now over thirty such clinics, and other European countries have at least one in their larger cities. Professor Jessen's clinic, at Strassburg, demonstrates what can be done at a comparatively slight expense.

In New York there are at present ten dental clinics. Of these, five do extractions only. With two exceptions those which do other work are closed after school hours, and comparatively few children are treated in any of these clinics, so that I believe it may be safely stated that at present there is no adequate provision for the treatment of the children of the poor. They may have every other disease treated in our medical clinics except this most widespread of all.

At one of the industrial schools of the Children's Aid Society, Dr. Wheeler organized a dental clinic about one year ago. It shows what can be done with comparatively modest means. In a small room at the top of the building about 800 cases are treated annually. The work is done by practicing dentists, who give their services gratis, each being in attendance one afternoon a week.

In various places the following methods of solving this dental problem have been tried, and all have been failures, more or less: (1) Practicing dentists, interested in philanthropic work, have offered to treat poor patients in their office gratis. (2) A certain number of dentists have been paid by the city to treat such patients at a definite time each day. (3) The members of dental associations have volunteered their services, taking turns in treating cases. After a time they found themselves unequal to the sacrifice. (4) Dental departments attached to regular medical clinics. Unless the dentists are salaried such clinics are not likely to be successful. The work, unlike the medical, is more or less of the same kind, and the practicing dentist is apt to find that he cannot spare the time.

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* From the fourth year they receive some instruction in hygiene. This is too late. The results show that the instruction as given is not adequate.

In none of these methods is there any direct connection with the school system, therefore it is impossible to control the treatment of cases. In only one way can such a clinic be successfully operated—it must be under municipal control. It should be organized and conducted along lines similar to the present hospital for the treatment of trachoma. "Diseases of the teeth, like other diseases, must be sought out, not left to declare themselves." The children should be regularly examined in school. Those who are unable to go to a private dentist may be referred to, and treated at, the clinic, permission being obtained from the parents. The clinic should be open after school hours and on Saturday. Each child should be provided with a card, on which should be noted the name, the date on which it attended the clinic, and the date on which it should return for treatment. In this way the school authorities could also control the attendance. At the clinic some instruction in the care of the teeth could be given, with demonstrations in the method of cleansing the teeth. The new dental clinic at Strassburg occupies the same building as the free baths. A similar plan could be followed in this city.

Cost.—Jessen estimates that it costs about one mark (25 cents) per child. In New York the cost would be somewhat greater. A liberal estimate would be 50 cents for each child. As an experiment a clinic with a capacity for treating 20,000 children could be conducted at an expense of $10.000 annually. This would include the salaries of four dentists and two nurses. There are about 300,000 school children in the Borough of Manhattan. Of these, approximately 100,000 are *poor* children, who require such dental treatment; but at present not 10 per cent. of these voluntarily seek treatment, so that at the beginning one such clinic would be sufficient. If successful, branch clinics could be established in other parts of the city.

250 West Eighty-eighth Street.

THE DISTRIBUTION OF BACTERIA IN BOTTLED MILK AND ITS APPLICATION TO INFANT FEEDING.*

BY ALFRED F. HESS, M.D.,
New York.
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So many experiments have been made and so much has been written upon the bacteriology of milk and the methods of obtaining pure milk, that it did not occur to me to inquire whether the question of the distribution of bacteria in milk was definitely understood. Some months ago, however, in the course of an investigation of tuberculous contamination of milk, I had occasion to centrifuge small amounts of milk and to make smears from the surface of the cream, which formed in a firm layer at the top of the tube. Although I had realized that the cream of the milk contains relatively many bacteria, I was impressed with the fact that these smears, on staining, showed an immense number of various organisms, including numerous chains of streptococci. This led me to inquire more closely into the distribution of the bacteria in our bottled milk, where the cream has risen by the natural force of gravity. I set myself the task of finding out where the bacteria in an ordinary bottle of milk may be found; not only whether, and to how great an extent, they are to be found at the top or at the bottom, but whether the divers layers, if we divide the cream arbitrarily into strata, contain relatively constant quantities.

The only method applicable to this end seemed to be the removal of definite amounts from the bottle, for the purpose of making separate bacterial estimations. With this object in view, I obtained numerous bottles of different brands of milk and pipetted off successive layers of cream or skim-milk. The technic of counting was that in use at the Research Laboratory of the Board of Health. Although a pipette was employed in most instances to remove the milk, in two series a 1-ounce dipper was used, and in two others simple pouring was employed.

The tables will best explain the results obtained. A glance at the section A of Table I. shows at once that the cream contains by far the greatest number of bacteria, and that the skim-milk, even in the lowest portion of the bottle, is relatively free. This has been brought out by Freeman and others. Heretofore, however, the cream has been regarded as a homogeneous unit, containing numerous bacteria in uniform suspension. Closer inspection of the table reveals that this is not the case; that in every instance the bacterial contamination is greatest in the uppermost cream, becoming always less and less as we approach the lean milk. This is equally true even in the milk which has been poured. The first ounce contains more bacteria than the second ounce, the second more than the third, and so on. The first 2 ounces, however, form a nidus for the greatest number of organisms. Section C of Table I. demonstrates this point, but as it is essential to the practical application which I shall later suggest, I have framed a second table (Table II.), which

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* Read before the New York Academy of Medicine, Section on Pediatrics. April 9, 1908.

TABLE I.

BACTERIA PER C.C. OF VARIOUS LAYERS OF BOTTLED MILK.

A	(1st 50 c.c.)	(2d 50 c.c.)	(3d 50 c.c.)	(4th 50 c.c.)	(5th 50 c.c.)	(Lowest 50 c.c.)	
1	130,000	101,000	48,000	18,000	3,000	7,000	
2	48,000	34,000	27,000	14,000	1,000	4,000	
	(1st 100 c.c.)	(2d 100 c.c.)					
3	38,000	6,000					
	(1st 100 c.c.)	(Remainder)					
4	36,000	5,000					
	(Upper ½ cream)	(Lower ½ cream)	(Remainder)				
5	116,000	17,000	1,000				
B	(1st oz.)	(2d oz.)	(3d oz.)	(4th oz.)	(5th oz.)	(6th oz.)	
1	108,000	79,000	58,000	41,000			
2	105,000	68,000	20,000	8,000	11,000	10,000	Poured.
3	124,000	89,000	108,000	58,000	10,000	2,000	Dipped.
4	243,000	184,000					
5	1,540,000	1,226,000	160,000				
C	(1st 2 oz.)	(2d 2 oz.)	(3d 2 oz.)	(Remainder)			
1	235,000	96,000	76,000	40.000			
2	115,000	36,000	7,000	6,000			Poured.
3	102,000	57,000	17,000				Dipped.

TABLE II.

1st 2 oz.	2d 2 oz.	Remainder.
93,500	49,000	
86,500	14,000	
235,000	96,000	40,000
115,000	36,000	6,000
102,000	57,000	
1,383,000		160,000

comprises counts of the first 2 ounces, the second 2 ounces, and, in some instances, of the remainder of the bottle. I would like to call attention to the last count of the series, where the first 2 ounces of the cream contained 1,383,000 bacteria, and the remainder of the bottle only 160,000 per c.c. In this instance, by removing the first 2 ounces, we freed the milk of about eighty millions of bacteria. This principle applies not only to milk of high bacterial count, but also to milk coming well within the range of certified milk, such as number 2 in group C of the first table, in which the average count of the bottle was less than 15,000 per c.c. Here the first 2 ounces contained 115,000 germs per c.c., so that when we include this portion in our formulæ we, by this means, contaminate the remainder of our milk. Or, if we add the next 2 ounces, using the upper 4 ounces, as some advise, we even then make use of cream containing 75,000 bacteria to the c.c.

I was interested to ascertain whether tubercle bacilli were likewise carried upward toward the surface of the cream by the rising of the fat globules. For this purpose I prepared a homogeneous suspension of bovine bacilli, with which I infected "loose" milk. Two to five c.c. to the quart were used, and the milk was allowed to stand twenty-four hours. On the following day 4 guinea pigs were inoculated with specimens taken respectively from the first 2 ounces, the second 2 ounces, as well as from the skim-milk and lowest ounces in the bottle. The inoculations were made intraperitoneally, and 1 ounce injected, with the result that many pigs died of infection before tuberculosis could develop. I have prepared a table (Table III.) of five such experiments, realizing that they are inconclusive, but believing that they show the preponderance of bacilli in the upper

TABLE III.

ANIMAL INOCULATION WITH TUBERCULOUS MILK.

Experiment	I.	II.	III.	IV.	V.
1st 2 oz. cream ...	.....*	Tb.	Tb.	Tb.	Tb.
2d 2 oz. cream	No Tb.	.....*	No Tb.	Tb.	.....*
Skim-milk	No Tb.	No Tb.	No Tb.	No Tb.	No Tb.
Lowest 2 oz.	.....*	No Tb.	No Tb.	Tb.	No Tb.

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* Signifies that pig died of early septic infection.

2 ounces. In order to obtain further information upon this point, I inoculated milk with larger amounts of tubercle bacilli in suspension, but instead of using animal tests I made smears from the different levels. Table IV. shows the results of two such tests. The smears demonstrated conclusively that tubercle bacilli are also carried upward by the fat globules. It was very striking to compare the number found at the very surface of the bottle with that from even the uppermost ounce of the cream.

Table IV.

SMEARS FROM MILK INOCULATED WITH TUBERCLE BACILLI.

	BOTTLE A.	BOTTLE B.
Surface of cream	Very large number of bacilli; some clumps.	Numerous bacilli; few clumps.
1st 2 oz.	Few bacilli; 1 clump.	Few bacilli seen.
2d 2 oz.	No bacilli seen.	2 bacilli seen.
3d 2 oz.	1 bacillus seen.	1 clump seen.
Skim-milk	No bacilli seen.	1 bacillus seen.
Lowest ½ oz. (dregs)	Few bacilli seen.	1 bacillus seen.

The statistics which I have given for gravity cream do not apply for centrifugal cream. If we centrifuge milk rapidly and for a considerable period, and then make smears from the cream, from the skim-milk, and from the sediment, we find that although many bacteria are in the upper layer, the sediment also is rich in bacteria, and contains many more than previous to the separation. If we centrifuge less rapidly or for a shorter period of time and obtain a less dense layer of cream, the conditions approach more nearly those of gravity cream. In other words, the result depends upon the relation of the artificial centrifugal force to the natural centripetal force of gravity; if the former is very great, it will drive many of the bacteria to the sediment. I do not mean to infer by this that we are able to obtain a pure cream by means of the centrifuge, but merely that the fresh cream obtained by this method contains fewer bacteria than the gravity cream. I may also add that what I have said throughout concerning bacteria applies equally to leukocytes—that they are also carried upward by the fat and are usually found in great numbers at the surface of the cream.

Having dwelt at some length on the purely theoretical side of our subject, let us now turn to its practical application. At the present day every effort is being made to supply a milk with the lowest possible degree of contamination. The certified milk was a long stride in advance, but unhappily at the present time its cost greatly curtails its helpfulness, and the number of its beneficiaries is comparatively small. Any suggestion, therefore, which would help to procure a less contaminated milk for the masses is certainly worthy of consideration. Now that we realize that the upper 2 ounces of the bottle harbor the greatest number of bacteria, the removal of this portion naturally suggests itself. Of course by this procedure we lose butter fat as well as bacteria. A bottle of milk, which averages about 4.2 per cent. fat, I have found will contain but 3 per cent. when the upper 2 ounces have been removed. A 5 per cent. milk is reduced to a 3.25 to 3.5 per cent. milk. However, this may frequently be of advantage, as probably most of us will agree. As Holt says: "There are many healthy infants who cannot digest even 4 per cent. of fat at any time, and many more who during hot weather do much better when a reduction to 3 per cent. or 3.5 per cent. is made." It is hardly necessary for me to particularize the instances in which a 3 per cent. milk is of value. I should like to draw attention, in passing, to the facility with which this "low-fat" milk is obtained, and to call attention to the fact that the method does not entail the necessity of pouring the milk into another vessel, and thus subjecting it to the danger of additional contamination; the cap needs merely to be reapplied to the bottle and the milk then shaken. A 3 per cent. milk procured in this manner contains fewer microorganisms than a similar milk obtained by the usual dilution of one-fourth water, and is less apt to contain tubercle bacilli, a danger by no means to be disregarded in the ordinary bottled milk. That its volume is less than the watered milk of equal richness may also be accounted an advantage, as surely nothing is to be gained by feeding an infant with large quantities of water. When we dilute a 4 per cent. milk one-fourth by adding 11 ounces of water to a quart, we obtain a 3 per cent. milk, but at the same time reduce the proteid to 2.6 per cent. if we consider the average proteid content of cow's milk to be 3.5 per cent. On the other hand, if we use the partially skimmed milk which I suggest, although the fat likewise equals 3 per cent., the proteids remain full strength, namely, 3.5 per cent. Considering the fact that the proteids are more frequently prescribed too low than too high in later infancy, this formula should prove useful.

As a basis for the current top-milk formulæ it is customary to use a 12 per cent. or a 10 per cent. milk, and a 7 per cent. milk; in other words, one formula in which the fat content is about four or three times that of the proteid, and another where it is only twice as great. In order to bring this method into conformity with these well-established principles, I have endeavored to duplicate these percentages, and have had various portions of bottled milk tested quantitatively for fat by the Babcock method, for which tests I wish to thank Mr. Congdon, of the Board of Health Laboratory, and Messrs. Harrison and Jeffers, of the Walker Gordon Laboratory. Many tests were made; the results are incorporated in Table V. From this it will be seen that the upper 2 ounces of the bottle contain on an average 24 per cent. of fat. This estimation and those that follow are based on 4 per cent. milk, which has been bottled about twenty-four hours; at any rate, for not less than fourteen and not longer than thirty-six hours. As these 2 ounces are discarded, a slight variation in the fat percentage cannot result in serious error. It is true that if the milk has been bottled for forty-eight hours or more, this layer becomes considerably richer. After 2 ounces are removed, the next 7 ounces contain 12 per cent. fat, 3.2 per cent. proteid; the next 8 ounces 10 per cent. fat and 3.3 per cent. proteid; the next 12 ounces contain 7 per cent. fat and 3.5 per cent. proteid. These figures are not absolute, as may be easily imagined; however, they compare very favorably with comparative tests made with top milk according to established methods.

TABLE V.

Method of obtaining 12 per cent, 10 per cent., or 7 per cent. milk after removal of the upper 2 ounces:—

	FAT.	PROTEID.
Next 7 ounces	12 per cent.	3.2 per cent.
" 8 "	10 " "	3.3 " "
" 12 "	7 " "	3.5 " "

I shall not weary you with an array of formulæ. The same formulæ may be prepared on this basis as are generally made use of in top milk preparations. I may add, however, that if one wishes to obtain a 4 per cent. milk with its normal quota of proteid, in other words, a full milk, one has only to add 3 ounces of the 10 per cent. cream to the 3 per cent. milk, which I have shown is so easy to prepare.

In closing, let me add that this method of preparing milk should prove particularly serviceable in the summer time, when we have so much to fear from bacterial contamination as well as from digestive disturbances due to a food too rich in fat.

My thanks are due to Dr. Park for suggestions freely given in the course of this work.

SUMMARY.

In bottled milk the bacteria are by far the most numerous in the upper layers of the cream, becoming gradually fewer in its lower portion.

The upper 2 ounces contain the greatest number of bacteria.

This is true of tubercle bacilli as well as of streptococci and other bacteria.

Therefore, instead of using the upper cream, as is now practiced, it is preferable to discard the upper 2 ounces.

The average bottle of such *partially skimmed milk* contains 3 per cent. fat and 3.5 per cent. proteid and is well adapted for infant feeding.

If we discard the upper 2 ounces we have: next 7 ounces, a 12 per cent. milk; next 8 ounces, a 10 per cent. milk; next 12 ounces, a 7 per cent. milk. With these figures as a basis the usual top-milk formulæ may be prepared.

(Discussion on page 622.)

THE ORIGIN OF ICTERUS NEONATORUM.—Von Knopfelmacher (*Ber. der Ges. für inn. Med. und Kinderhk. in Wien.*, 1097, Beil. VIII.) examined 43 infants and became convinced that the mechanical overflowing of bile from the bile capillaries cannot be the cause of icterus, but that the real cause is the passage of the bile directly from the liver cells into the blood circulation (icterus per diapedesis).—*Der Kinderarzt,* November, 1907.

RUBELLA: A REPORT OF AN EPIDEMIC OF EIGHTY CASES.*

BY MAY MICHAEL, M.D.,

Chicago.

Description of the Epidemic.—In an institution for children it was found, on the morning of May 7, 1907, that 8 inmates were covered with the eruption of rubella. The following day, May 8th, 5 more were affected; on May 10th, 7; on May 11th, 4; on May 12th, 1. The ensuing four days there were no new developments, but on May 17th, ten days after the appearance of the first case, 1 more was discovered. Following this period, children fell ill every day until June 8th, when, all told, 80 children had contracted the disease. It is impossible to estimate the exact incubation period, inasmuch as neither is the original source of infection known, nor how many of the children were infected from the original source, nor how many from the first cases. It can be definitely stated, however, that the period of incubation covered more than ten days.

At the time of the epidemic there were 114 boys and 85 girls in the institution. Of the 80 children affected, 51 were boys, 29 girls. All the children less than six years contracted the disease except 3; of the older ones only a fourth were infected. Three children were under two years; 43 were between two and six years; 25 between six and ten years; 9 were over ten. The oldest child was fourteen years.

The eruption was the first symptom in all but 2 children, 1 of whom had a conjunctivitis, and the other a slight temperature and loss of appetite for a day or two previous to the appearance of the eruption. The eruption appeared first on the face, then rapidly spread over the rest of the body. At the first examination the face, chest and arms were usully well covered. By the time the lower extremities were affected at the end of twenty-four hours, the eruption on the face had already begun to fade. Although there was some variation in the character of the eruption, in the majority of instances it could be described as follows: During the first twenty-four hours pale rose-red, slightly raised maculo-papules were scattered thickly over the face (forehead, cheeks, chin, behind the ears, around the mouth), the chest, arms and sparingly over the trunk; there rarely were any on the lower extremities. The lesions were round or irregular in shape, varying in size from a pin head to a split pea, usually discrete but often confluent on the face. During the second twenty-four hours the rash was abundant on the lower parts of the body, with confluence of the lesions on the buttocks and in the popliteal spaces. The lesions on the face had almost disappeared, while those on the chest were much paler. As the eruption faded, it looked purplish and mottled, especially on the posterior surface of the arms and legs and on the buttocks, where it remained longest. The eruption was frequently found on the palms and soles, and in 17 of the cases was seen also on the mucous membrane of the soft palate, where it consisted of red papules the size of a pin-head. In some cases the eruption consisted of only a few maculo-papules scattered over the face, trunk and extremities; in others, the papules were abundant and formed irregular raised blotches, impossible to distinguish from measles (rubella morbilliforme). In still others the eruption was bright red and confluent over large areas (especially over the abdomen, back and buttocks), while over the rest of the body it showed the usual maculo-papular character. In 1 case there was a diffuse redness over the entire body (rubella scarlatiniforme).

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* Read before the Chicago Pediatric Society, March 17, 1908.

In some cases the eruption disappeared entirely in three days. In others it disappeared from the face and trunk in 48 hours, but the mottled appearance on the back of the arms and legs persisted five or six days. Sometimes it seemed to have disappeared entirely, but exposure for inspection brought it out again. In 9 cases the eruption lasted three days; in 18, four days; in 24, five days; in 22, six days; in 6, seven days; in 1, eight days. A fine branny desquamation was noted in 35 instances.

Associated Symptoms.—The constitutional symptoms were so mild that it was difficult to keep the children in bed. The temperature ranged from normal to 102.2°. In 9 cases the temperature never rose above 98.8°. In 39 the highest temperature was 99°, or 99° and a fraction; in 27 it was 100°, or 100° and a fraction; in 4 it was 101°; in 1, 102°. It was slightly higher in the evening than in the morning; was highest on the first day in 51 cases; on the second day in 13 cases; on the third day in 5 cases; on the fourth day in 2 cases. It lasted one day in 22 cases; two days in 20 cases; three days in 16 cases; four days in 8 cases; five days in 3 cases; six days in 1 case; seven days in 1 case. To summarize, in more than half (48) the highest temperature was 99° or less, and lasted only two days. The pulse corresponded to the temperature.

Conjunctivitis occurred in 32 cases, but it was too mild to cause any discomfort. The symptoms, on the part of the respiratory organs, were insignificant. In 19 cases there was a slight coryza, in 4 a bronchitis. Although there was no complaint of sore throat, a diffuse redness and the eruption on the soft palate were observed in 17 cases.

All the children, except 3, suffered from glandular enlargement. In 70 the anterior and posterior cervical, the axillary, and the inguinal glands were involved; in 3 the cervical and axillary only; in 3 the axillary only; in 1 the cervical only. The enlargement was apparent on the first day and was the last symptom to disappear. The glands varied from the size of a bean to that of a marble, were hard, and could be rolled beneath the finger. There was never any suppuration. The spleen was palpable in 2 cases, the enlargement disappearing with convalescence.

The result of leukocyte counts made in 64 cases was the finding of a leukopenia in 45, a normal count in 15 and a leukocytosis in 4. The average count of those showing a leukopenia was 7,700; the lowest count was 5,140. Of the four counts showing a leukocytosis, one was accounted for by a previous suppurative adenitis, two by chronic otitis media, but for the fourth no cause was found. The blood of only 2 patients was examined during convalescence. In these there was a slight leukocytosis (12,000-13,000).

The urine was examined for albumin and the diazo reaction in 76 cases. Of the 2 children whose urine showed the reactions, 1 developed the rubella before she had recovered from chicken-pox, and the other was a marantic baby of twenty months. In the first child both reactions were obtained on the first day only; in the second, they were obtained for three days.

Two relapses were recorded. In both cases the second eruption appeared fifteen days after the disappearance of the first.

Complications.—Two children developed chicken-pox before recovering from rubella; 1 developed rubella before recovering from chicken-pox, and one child had a severe ulcerative stomatitis.

Diagnosis.—The diagnosis in the epidemic was not difficult. The sudden onset without prodromal symptoms, the character of the eruption, the mild course, the absence of symptoms on the part of the respiratory system stamp the disease as rubella. In a few instances, so far as the rash was concerned, it might have been mistaken for measles. The presence of other cases of rubella, however, and the mild constitutional symptoms, made the diagnosis clear in spite of the abundant rash. Moreover, with 24 of the children there was a clear history of a previous attack of measles, and 25 more developed that disease in the epidemic of measles which followed the one of rubella. The question of scarlet fever was never considered; in the few instances in which the eruption was scarlatiniform there were areas in which the papular character of the eruption could easily be distinguished.

It is surprising to note the volume of literature bearing on this subject. From the middle of the eighteenth century, when the first authentic description of the disease appeared, to the present time interest in it has never waned. The first discussions were as to the identity of the disease, then came descriptions of epidemics and of variations in its normal course, and lately the question has arisen whether two diseases are not described under the name of rubella, namely, rubella and Filatov-Dukes, or Fourth Disease.

The question of the identity of rubella was established at the International Congress of Medicine, London, 1881, when the conclusions were drawn that rubella is a specific entity unrelated to either measles or scarlet fever and protecting only against future attacks of rubella.

The disease is described under several names. The Germans call it rötheln, the French rubeola, the English and Americans German measles or rubella. Other symptoms are rose rash, rubeola sine catarrho, rubeola epidemica, rubeola morbillosa, rubeola scarlatinosa, roseola epidemica, hybrid, bastard or spurious measles; hybrid, or bastard scarlatina.

Writers do not agree as to the degree of contagiousness; some regard it as more, some as less, contagious than measles. The concensus of opinion, however, is that upon exposure to it more escape than when exposed to measles. Young children between three and six are very susceptible, and adults are more susceptible to it than to measles.

Incubation.—Different authors assign the incubation of rubella to a period varying from five days to three weeks. The following table, to which additions have been made, has been taken from Welch and Shamberg:—

Atkinson	14-21 days	Hatfield	10 days
Balfour	2 weeks	Jacobi	14-21 days
Bäumler	17-21 days	Kassowitz	2-3 weeks
Boudet	12-14 days	Klaatch	2½-3 weeks
Bourneville	8 days	Longstet	18 days
Briscon	8-10 days	Mettenheimer	2 weeks
Bristowe	1 week	Musser	6 days (1 case)
Brownlee	13-21 days	Picot	2-3 weeks
Brown, C. H.	6-17 days	Pollock	6-16 days
Brück	2-3 weeks	Poynter	2 weeks
Cheadle	15 days	Jubel-Renoy	15 days
Clausen	17-20 days	Robinson	6-7 days
Cotting	3 weeks	Ross	5 days-3 weeks
Cullingworth	2 weeks	Sager	2-3 weeks
Cuomo	17 days	Saillant	7-21 days
Curtis	1 week	Scholl	5-21 days
Dillingham	5 days-4 weeks	Seitz	17-21 days
Duckworth	16 days	Steeves	10 days
Duke	15-16 days	Steiner	10-14 days
Earle	17-21 days	Smith, J. S.	7-10 days
Edwards	10-12 days	Tonge-Smith	14 days
Eichorst	2-3 weeks	von-Strümpell	2-3 weeks
Emmingshaus	2-3 weeks	Squire	8-21 days
Flood	15 days	Thierfelder	2 weeks
Foss	2-7 days	Thomas	2½-3 weeks
Gerhardt	2-3 weeks	Townsend	12-21 days
Glaister	4-5 days or more	Vacher	12-13 days
Goodhart	2 weeks or more	Wolberg	2-½ weeks
Griffith	5-11 days	Veale	10-12 days
Hardaway	2 weeks or more		

Invasion.—Although the eruption is usually the first symptom, as was the case in the epidemic under consideration, a prodromal stage has been observed. This, in the majority of instances is short (one-half to one day) and is characterized by malaise, headache, mild catarrhal symptoms, and a slight rise in temperature. Its duration, however, varies and may be prolonged to seven days. Among the more unusual prodromal symptoms are nausea and vomiting, diarrhea, sore throat and bronchitis; pains in the back and limbs; stiffness and pain in the joints; convulsions and delirium. Many writers mention the glandular enlargement as a prodromal symptom, and some speak of prodromal rashes either urticarial or erythematous in character. Hemorrhages from the nose, ears and eyes have been reported during this stage. Sometimes there is an initial chill, followed in a few hours by the eruption.

Symptomatology.—The location, character and duration of the eruption are usually as has already been described. Instead of appearing first on the face, it has been found first on the trunk, breast or arms, or on the legs below the knees. Instead of consisting of the ordinary maculo-papules, minute vesicles have capped the lesions. In Germany this finding has led to the question whether the so-called epidemics of "Schweissfriessel" were not in reality rubella. The blotchy measles eruption seems fairly frequent (rubella morbilliforme). Sometimes it resembles scarlet fever more closely than it did in any case of the epidemic studied. The entire body is then covered by a uniform punctate red rash (rubella scarlatiniforme). Severe itching sometimes accompanies the eruption. The eruption lasts from one to seven days and is frequently followed by a fine branny desquamation.

The constitutional symptoms correspond with those already outlined—a slight temperature, coated tongue, occasional cough, and sore throat. The most characteristic symptom seems to be a glandular enlargement, which affects chiefly the posterior cervical glands, but does not spare the anterior cervical, the axillary and inguinal. Spleen enlargement has been observed. The urine is usually normal. The blood shows a leukopenia during the stage of eruption and a slight leukocytosis during convalescence.

Severe forms of the disease have been described since its early history. These are characterized by a high temperature (103° to 105°), rapid pulse, continual nausea and vomiting, diarrhea, angina with exudation, laryngitis, convulsions and delirium. The rash is very abundant, either morbilliform or scarlatiniform. Sometimes the eruption is hemorrhagic. The disease has, in numerous cases, ended fatally.

Rubella without an eruption has been described. Seitz quotes Reed, who observed an eruption on the tonsils and soft palate without any on the body, and Seitz, in one of his own cases, confirmed the diagnosis by a typical rubella eruption in a sister.

Complications.—Pneumonia and bronchitis are the most frequent complications; epistaxis, empyema and pleurisy have been observed; stomatitis is fairly frequent. Suppuration of the lymphatic glands and otitis media have occurred. Albuminuria, alone or accompanied with dropsy, dysuria and suppression of urine have been reported as complications, as well as tuberculous meningitis, phylectenular keratitis, thyroiditis, severe secondary angina and polyneuritis. Attacks of urticaria have been noted by some writers.

Relapses and Second Attacks.—Reports of relapses are comparatively frequent and have occurred in from one day to three weeks after the disappearance of the first eruption. Very few records of second attacks of rubella are to be found. V. Nymann reports 2 cases after nine months and Seitz 2 cases, 1 one year after the first attack and 1 three months.

Diagnosis.—Rubella occurring in epidemics in its typical form is not difficult to diagnose, but when it occurs sporadically and in atypical forms, the diagnosis is attended with great difficulties. Measles is the disease with which it is most often confounded. The prevous medical history is of importance, for recurrent attacks of either disease are rare. Measles has a prolonged stage of invasion, four or five days, characterized by fever and catarrhal symptoms and the catarrhal symptoms are, as Welch and Shamberg express it, more severe in mild attacks of measles than in severe attacks of rubella. Koplik's spots are found on the buccal mucous membrane during this stage. The eruptive stage, also, is attended with catarrhal symptoms, as coryza, conjunctivitis, laryngitis and bronchitis. The eruption of measles spreads and disappears more slowly than that of rubella, so that the entire body is covered at the same time. It causes more swelling of the face. The temperature is higher, the constitutional symptoms are more noticeable and the patients feel sicker. The diazo reaction is usually present. Glandular enlargement is not so marked as in rubella. It is impossible, however, in the absence of an epidemic, to distinguish severe cases of rubella from measles, and cases of measles, which sometimes occur without catarrhal symptoms, cannot be distinguished from rubella.

Epidemics of rubella frequently follow or precede one of measles. Directly after the epidemic just discussed one of measles followed. The literature contains reports of many such instances. Emmingshaus believed it always to be the rule. Hufeland described an epidemic of rubella followed by measles. Willan, one of measles followed by rubella. Kramsytyk saw 9 cases of rubella followed by measles.

Rubella scarlatiniforme and scarlet fever may be confounded. The incubation period of scarlet fever is shorter than rubella. The stage of invasion is characterized by higher temperature, vomiting and severe constitutional disturbances. The eruption appears first on the neck and chest and is very similar to the rubella eruption, but in the latter careful inspection will often reveal areas where maculo-papules can be distinguished. Desquamation in scarlet fever is much more marked. The throat symptoms are more severe, the tongue has the characteristic strawberry appearance and the blood shows a leukocytosis. The presence of unmistakable cases of either disease is an aid to diagnosis.

Rashes following the administration of certain drugs (balsams, iodin, salts of quinin chloral or antitoxin) sometimes resemble the rash of rubella, but these eruptions are not accompanied by fever, spare the mucous membranes and occur chiefly on the extensor surfaces. The history of the use of the drug is of value in diagnosis.

Infectious erythema described first by Escherich must be distinguished from rubella. The rash of erythema infectiosa appears first on the face, but is limited by the nasolabial folds and consists of large raised maculo-papules, pale rose-red or violet, with edematous centers. The eruption then appears on the extremities, spreading from above downward and usually sparing the trunk. It lasts about ten days and is not followed by desquamation. There is no glandular enlargement or catarrhal symptoms.

Filatov, in 1885, and Dukes, in 1900, asserted that two diseases were described under the name of rubella. Filatov adheres to the name rubella scarlatiniforme though he believes this disease distinct from rubella; Dukes calls it the "Fourth Disease." His description of the Fourth Disease, however, corresponds to that of rubella scarlatiniforme. The incubation period is between nine and twenty-one days. The prodromal period is absent or lasts only a few hours. The rash is the first symptom in the majority of instances and consists of rose-red points very near together. It lasts only a few days and is followed by desquamation. The throat is red and swollen; the tongue slightly coated; the conjunctivæ injected; the glands of the neck, sometimes those in the axillæ and groins, swollen.

Dukes draws his conclusions from the study of 3 epidemics, but his proofs that this disease is distinct from rubella are far from conclusive. The first epidemic of 16 cases diagnosed at first as scarlet fever, occurred in a public school. Subsequently Dukes diagnosed the disease as the "scarlet fever variety of rose rash." However, he offers as the only proof for this conclusion the fact that no cases of scarlet fever developed in the community when the children went home for the holidays. The second epidemic of 31 cases gave evidence of the simultaneous presence of two diseases. One, without question, was scarlet fever, the other Dukes calls Fourth Disease, but there is nothing in the symptomatology to distinguish it from rubella. The third epidemic was regarded as "Fourth Disease," because 42 per cent. of the patients had already had rubella, yet the description of this epidemic corresponds, as regards the rash, desquamation, the throat symptoms and enlarged cervical glands, to one of scarlet fever. Dukes' views were accepted by Broadbent, Romer, Kidd, Ashley and others; but Millard, Washburn, Ritter, Poynton, Williams, Ross and Griffith believe the illness called "Fourth Disease" to be either mild scarlet fever or rubella. Von Bokay accepts the existence of the Fourth Disease, and Klein, Ruheman and Unruh published reports which they believe conclusive of its identity since their observations were made on children who previously or subsequently had rubella and scarlet fever. The question, however, is not yet settled and must be very carefully considered because of the great danger to the community should mild cases of scarlet fever be diagnosed either as rubella or Fourth Disease.

Prognosis.—In the majority of cases the prognosis is absolutely favorable. At times of severe epidemics, death among delicate children is not unusual, as is often reported in the literature.

Treatment.—Mild cases do not require treatment. The patient should be kept in a warm, well-ventilated room, preferably in bed if fever or catarrhal symptoms are present. Severe forms and complications are treated symptomatically. In institutions isolation should be practiced for fourteen days.

(Discussion on page 633.)

CONGENITAL LARYNGEAL STRIDOR APPARENTLY DUE TO AN ENLARGED THYMUS GLAND. REPORT OF A CASE.*

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Milwaukee, Wis.

In one of their papers on the subject Thomson and Turner give in a single paragraph so clear a picture of a typical case of congenital stridor that it is well worth quoting: "The infant, who appears normal in other respects, is noticed shortly after birth to have noisy breathing. The noise consists of a croaking sound accompanying inspiration, which rises to a high-pitched crow when a longer or more vigorous breath is taken. Expiration may be accompanied by a short croak when the stridor is loud, but at other times it is noiseless. Even in the most severe cases there are occasional brief intervals, during which there is no sound audible; but, with this exception, the stridor goes on constantly while the child is awake, and sometimes even when he is asleep. Any emotional excitement, or any physical cause of deeper breathing, such as exposure to colder air or the exertion of sucking, is apt to intensify the sound. The child's power of crying and coughing is unaffected. The breathing, though noisy, is not accompanied by the slightest distress, and there is no cyanosis. There is, however, always marked inspiratory indrawing of the thoracic and abdominal walls, except in the mildest cases."

While the clinical features of congenital laryngeal stridor are well defined, there is still much disagreement as to the manner of its causation, and the definition which Rabé gives in his recent excellent article on the subject seems to be hardly justifiable. He defines the condition as a manner of respiration characterized by an inspiratory noise, sonorous and continuous, appearing immediately after birth, or several days after, and *connected with the existence of congenital malformations of the larynx.* These malformations of the larynx he would divide into two types following Variot's classification. In the first group are those cases in which the deformity is very marked, with the epiglottis folded on itself into a narrow gutter, and the aryteno-epiglottic folds so soft and flabby as to approach or meet in the middle line, leaving only a narrow chink between. There is thus formed a vestibule, which sinks in and vibrates under the influence of the current of inspired air. The second group comprises those in which the deformity is less marked and is limited to the epiglottis, which is rolled on itself in the same manner as in the first group, but to a lesser degree. By reason of this rolling the aryteno-epiglottic folds are brought into contact, but only in their anterior thirds. In this type the stridor results chiefly from the vibration of the epiglottis. No provision is made in this classification for those cases in which the clinical picture is present in its entirety, and in which no laryngeal abnormality can be demonstrated.

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* Read before the Chicago Pediatric Society, March 17, 1908.

Thomson and Logan Turner are inclined to look upon these laryngeal or vestibular deformities, which unquestionably are present very frequently, as acquired factors, the result of poorly-coordinated and spasmodic inspiratory movements acting upon the soft and pliable tissues of the infantile larynx. From this point of view the primary defect is in an arrest of development of the cortical center for respiration, so that a type of incoordinated respiration is produced, which may be compared with stammering.

The other important theory as to the etiology is that of tracheal compression, most often by an enlarged thymus gland. This was advocated by Kopp nearly eighty years ago, and in recent times by Avellis and Hochsinger. Avellis based his belief in the thymic origin of congenital stridor on the similarity between the symptoms of this condition and those seen in some cases of hypertrophied thymus, on the clinical course of the process which suggests its connection with the thymus, and on the results of treatment. He did not discover any physical signs of enlarged thymus in the 4 cases he reported. He mentioned the occurrence of congenital stridor in several members of the same family, but no attempt was made to draw any conclusions from this fact, which has been mentioned by a number of other observers.

Hochsinger studied the size of the thymus by means of X-ray plates in 26 cases of congenital stridor, and found definite enlargement in every case except one. He also found the thymus enlarged in 20 out of 32 other young children suffering with rickets, and the frequency with which he demonstrated thymic hypertrophy seems to have militated against the attachment of much weight to his report.

On account of the diversity of opinion on the question of etiology, the report of the following case would seem to be of interest, because it shows the coexistence of congenital stridor with thymic enlargement, and the disappearance of the stridor when the thymus was reduced in size by treatment.

M. B., female, the only child of young and healthy parents, was born July 21, 1907, a forceps delivery terminating a comparatively short labor. There was no asphyxia and no cyanosis, but it was noticed that the respiratory rate was very rapid from the time of birth. When the baby was a week old the inspirations were observed to be labored in character, and a crowing sound began to be heard with inspiration. The stridor gradually became more marked, the inspiratory difficulty steadily increased, and by the time the baby was three or four weeks old the bulging forward of the sternum with inspiration appeared. The child was always breast fed, there was never any difficulty in swallowing, there was no vomiting, the stools were always good, and gain in weight was steady throughout. There was no cough, and never any cyanosis.

When the child was seen for the first time, on September 13th, at the age of about eight weeks, she was found to be a normally developed and well nourished child, weighing 9 pounds, an increase of 2 pounds over her birth weight. Her skin and mucous membranes and finger nails were of good color. Her tongue was clean and not enlarged, her pharynx was normal, nasal respiration was free, and no adenoids could be found in the nasopharynx. Her abdomen was normal, and the superficial lymphatic glands were not enlarged.

On inspection of the chest one was impressed by the labored character of the inspirations. These were accompanied by so marked a recession of the suprasternal notch and the epigastrium that the upper and lower ends of the flexible sternum were approximated, producing a remarkable forward bowing of this bone. At times it seemed to bend almost into a semicircle, having the line of its convexity in the long axis of the body. With this there was an indrawing of the intercostal spaces and a slight depression laterally on each side of the sternum. The crowing sound which accompanied the inspirations was very plainly heard even when the child was in an adjoining room with the doors closed. The crowing and the labored inspiration were almost continuous, although when the baby was very quiet she would sometimes breathe softly and naturally for a minute or two. The mother of the patient stated that when the infant was in a deep sleep the quiet breathing would sometimes last for nearly half an hour, but never longer. When the child cried or became excited from any cause the stridor and labored breathing became more marked, but at no time did the voice sound hoarse or harsh or in any way abnormal. Even when the breathing was most labored the expression on the child's face was placid and contented. Expiration was normal.

Behind the upper part of the sternum a mass could be easily outlined by percussion. It was an irregular quadrilateral in shape, the upper border extending from the right sternoclavicular articulation 2.5 cm. to the left, into the first intercostal space on the left side. The right border followed the right edge of the sternum a distance of 3 cm. down to the third interspace. The lower border at this level measured 1.5 cm. transversely, and the left border was formed by an oblique line connecting its termination with the left end of the upper margin. In addition to the dull percussion note over this area the feeling of resistance to the percussing finger was very definitely localized and helped to define sharply the outline. By introducing the tip of the finger deep into the suprasternal notch it seemed as though a mass could be felt indistinctly with expiration, but this procedure caused so much respiratory disturbance that a definite decision was not reached.

The lungs seemed fully expanded and everywhere resonant, except over the right apex posteriorly where the percussion note was slightly impaired. There was also a small area of dullness in the interscapular region just to the right of the spine. The breath sounds were harsh and rhonchi were heard everywhere.

The child seemed to prefer to lie on her left side and the stridor was increased by placing her on her back, and still further increased when her head was overextended or overflexed. At times, when the stridor was marked, raising her from a lying to a sitting position apparently added to her comfort, but did not cause a disappearance of the crowing. These last-named features are the only ones that would enable one to differentiate clinically such a case as this from those cases in which the larynx is markedly deformed.

A laryngoscopic examination was made on the day the child was seen for the first time, and a normal infantile larynx was found. A subsequent examination was made several weeks later, and these findings were confirmed.

The normal evolution of a typical case of congenital laryngeal stridor is interesting in its course. The characteristic inspiratory noise, which usually appears at birth, or in the first few days of life, gradually increases in intensity during the second and third months; it then remains stationary until about the eighth month. After this time it gradually decreases and disappears by the end of the second year. In one of Variot's cases the stridor had disappeared by the end of the eighth month, and even earlier cures have been reported, while in one of Comby's cases the condition persisted into the third year, and in Perrucker's patient operation was performed for the relief of the symptoms at the age of two and one-half years. In most cases there is no interference with the general growth and development.

While the outcome is almost invariably good, in spite of the alarming character of the symptoms, it is well to remember that certain complications may seriously affect the prognosis. In cases of laryngeal stridor the occurrence of attacks of laryngitis, bronchitis, bronchopneumonia and lobar pneumonia is especially serious. Ten autopsies have been made on cases where this condition was present during life, and in all but two death was due to disease of the respiratory tract. Four deaths were caused by bronchopneumonia, and one each by lobar pneumonia, laryngeal diphtheria, simple laryngitis and pulmonary tuberculosis. Of the other two deaths one was due to scarlet fever and one to convulsions. In this last case no macroscopic or microscopic changes could be found, except a moderate deformity of the larynx.

When laryngeal abnormalities are present and no changes in the thymus can be found, it may be necessary to do very little, except to await the natural evolution of the process, using such measures as may be needed to maintain the general health of the patient at its highest level and carefully treating the slightest derangements of the respiratory tract to prevent the development of more serious pathological conditions, although attacks of dyspnea of great severity might require intubation or tracheotomy.

But when there is an enlargement of the thymus, demonstrable either by physical signs or by X-ray examination, or strongly suggested by the symptoms, it seems hardly justifiable to follow a course of "masterly inactivity," since the tragic possibilities of this condition are so well known.

Operative intervention in enlargement of the thymus was practiced for the first time by Rehn, in the case reported by Siegel in 1896. The patient was a boy two and one-half years of age, who was well until a difficulty in breathing was noticed five weeks before admission to the hospital. This increased steadily, and at the time of admission the dyspnea was so severe that a tracheotomy was performed at once. No relief was afforded until a long canula was introduced, which reached almost to the bifurcation. Every attempt to replace the long canula by a shorter one was followed by a return of the symptoms. An enlarged thymus was suspected, although no physical signs of it could be detected. A median incision was made, and a mass of thymus gland the size of a hazel-nut was found presenting with expiration, while with inspiration it sank back into the mediastinum. The thymus was drawn out as far as possible and stitched to the fascia covering the sternum. The wound was then closed. Recovery was complete.

Rehn's second case was one of congenital inspiratory stridor, with cyanosis added to the typical symptoms. In this case a small rounded tumor could be noticed in the jugulum during expiration. Operation was performed at the age of four months. A median incision was made and the capsule of the gland divided. As the gland substance tore very readily and disappeared deep in the mediastinum with each inspiration, it was necessary to make use of each expiration to remove a piece until its size was reduced to such an extent that it could be lifted up by a dull curette. Rehn recommends that the capsule be sewed into the wound so that the space left may be drained. He thinks that complete removal of the gland is hardly possible and that resection of the sternum is not necessary in ordinary cases. If it seems desirable the operation may be done without anesthesia.

In 1897, König operated upon a baby nine weeks of age, which had suffered from inspiratory dyspnea and cyanosis from the second week of life. A soft, rounded tumor appeared in the jugulum with expiration. After drawing the gland up into the incision the capsule was split and the greater portion of the gland removed. The remaining stump of the gland was fixed by stitching the capsule to the sternum and the tendinous attachment of the sternomastoid. Recovery was good, but shortly after the operation the child developed a severe rachitis and did not walk until four and a half years of age.

König's second patient was in the first year of life, and presented symptoms similar to those just mentioned. The stridor was both inspiratory and expiratory, and in this case also there was a palpable thymus. König removed the right lobe of the thymus and fixed the left lobe to the fascia, and also did a deep tracheotomy, but the symptoms persisted. At a second operation the remainder of the thymus was removed and the opening of the thorax enlarged by the resection of a portion of the manubrium. Complete recovery followed.

Perrucker's patient was a child of two and a half years, but differed from Rehn's first case in that he had presented from birth the typical picture of congenital laryngeal stridor, with the addition of extreme hoarseness and a weakened voice. No physical signs of an enlarged thymus were present, except that auscultation revealed a murmur of stenosis equally clear on both sides. Operation showed the thymus to be greatly enlarged, and the moment it was drawn forward the stridor disappeared. The gland was removed and recovery was complete, but the hoarseness persisted, although the larynx was normal.

Aphonia was also present in Ehrhardt's case, that of a girl two years of age, and the other symptoms resembled closely those of Perrucker's patient, but, instead of being congenital, the condition developed acutely with fever two months before coming under observation. The larynx was normal and no physical signs of enlarged thymus could be detected. Intubation gave no relief. A median incision was made, and as the tissues were divided an enlarged thymus was seen presenting in the jugulum with each expiration. Its enucleation was not especially difficult and the relief obtained was prompt and permanent.

In J. L. Morse's case dyspnea existed from birth, although its character differed from that of the typical case of congenital stridor. Both inspiration and expiration were noisy and difficult, especially the latter. The larynx was normal and the thymus could not be felt. No area of dullness could be made out under the manubrium. A diagnosis of hypertrophy of the thymus was made, but the consent of the parents to an operation could not be obtained until after a long delay, during which the child's general condition grew steadily worse. At the age of eleven weeks the baby was operated upon by Dr. F. T. Murphy, and the thymus was found to turn back against the trachea in inspiration. Upon drawing it forward the dyspnea, both inspiratory and expiratory, was markedly relieved. When the gland was allowed to drop back the dyspnea recurred. The thymus was drawn forward and anchored and a part of the manubrium was cut away to enlarge the opening. Although the respirations became less labored the child did not do well, and death occurred sixteen days after the operation. Postmortem, the gland was found anchored in its new position, where it seemed to exert no pressure upon the trachea.

The most recent operation upon the thymus is that reported by Jackson in the case of a four-year-old boy, well until six weeks before coming under observation, when there was a sudden croupy attack. This was followd by persistent and increasing stridor and dyspnea. The larynx was free, but a radiograph showed the shadow of an enlarged thymus gland. A tracheotomy was performed and a long canula, reaching almost to the bifurcation was introduced. This gave entire relief, but whenever an attempt was made to remove the tube or to substitute a shorter one, the symptoms recurred. Four weeks after the tracheotomy a second operation was performed and the enlarged thymus was removed with comparative ease. The presence of the long canula in the trachea was a great help in preventing the operative manipulations from interfering with the respirations. The boy made a good recovery and there has been no return of the stridor or dyspnea.

From this review of the reported cases, it is clear that operative intervention in enlargement of the thymus is a safe procedure, even in very young infants. Of the 8 cases operated upon only 1 died, and in that case the inference seems permissible that if the parents had consented to an earlier operation a favorable result might have been obtained.

In July, 1907, Friedlander reported a case of "Status Lymphaticus and Enlargement of the Thymus" occurring in a male infant, in whom whistling inspiration and paroxysms of dyspnea with cyanosis began to manifest themselves at the age of five weeks. The physical signs of enlarged thymus were very definite. As the symptoms grew steadily worse in spite of inunctions and internal medication, treatment by X-ray exposures was instituted when the child was eight weeks of age. Within two weeks distinct improvement was apparent, and under a continuation of the treatment the progress to complete recovery was continuous and uneventful.

Encouraged by this result, it was thought best to follow a similar course in the case under consideration before suggesting operation. X-ray exposures were begun on September 14th, using a tube of moderate hardness, energized by a static machine. The first exposures were made at a distance of 12 inches, but later this was reduced to 10 inches. The first exposures were short, only one minute anteriorly and an equal time posteriorly. This was gradually increased as time went on, and during the latter part of the course the front of the chest was given ten minutes and the back five minutes. Six exposures were given in the first eleven days, and as early as this some improvement manifested itself by longer periods of quiet sleep at night and less labored respiration during the day. A rest of ten days was then ordered to await developments, but at the end of five days the mother brought the baby for further X-ray treatment, saying that the trouble had increased in severity as soon as these were discontinued. From this time they were given as nearly every day as the weather permitted. In all, forty-seven exposures were given. Nothing more than a transient erythema at the site of exposure was seen on the skin at any time.

Improvement took place gradually but steadily. The rest became quieter at night, the crowing diminished in intensity, and the periods of freedom became longer, the bowing forward of the sternum and the indrawing of the suprasternal notch and epigastrium gradually diminished. The size of the thymus as indicated by the physical signs steadily grew less.

In the latter part of October the administration of thyroid gland was begun with a twofold purpose—to prevent any nutritional disturbance which might result from a partial interference with the activity of the thyroid gland, as this could not be entirely protected from the rays; and to make use of its antagonistic effect on the thymus, to which Solis-Cohen has directed attention. The improvement, which was already taking place under the X-ray exposures, continued uninterruptedly, while the thyroid gland was being given and seemed to be perhaps a little accelerated by it, but no definite opinion as to its beneficial action can be given.

The last X-ray exposure was given December 11th. By this time the area of thymic dullness was reduced to a half-inch equilateral triangle behind the manubrium. The dull area posteriorly had disappeared long before. The baby slept quietly all night and breathed quietly most of the day, but still had a trace of the inspiratory crow when crying hard or when greatly excited.

Improvement continued after the X-ray treatments were discontinued, and on February 11, 1908, the following note was made: "Normal baby, no thymic dullness, no bowing of sternum with inspiration, no abnormal sound with inspiration, except an occasional little snort. There is a slight indication of a tendency to pigeon breast."*

In conclusion, the interesting features may be summarized as follows:—

(1) Coexistence of the clinical features of congenital laryngeal stridor, with physical signs strongly suggesting enlargement of the thymus gland.

(2) Disappearance of these physical signs under X-ray treatment.

(3) Coincident clearing up of the symptoms of laryngeal stridor.

It is not maintained that every case of congenital laryngeal stridor has an enlarged thymus as a causative factor, but it is maintained that such an enlargement may give rise to this symptom complex, and that cases of this character are within the reach of our therapeutic resources.

(Discussion on page 634.)

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*When seen May 25, 1908, this tendency to the formation of a pigeon breast had almost completely disappeared and the child's general condition was satisfactory in every way.

ARCHIVES OF PEDIATRICS.

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INSTRUCTING MOTHERS AND OLDER GIRLS IN THE CARE OF BABIES.

In no department of medicine are we likely to obtain more striking results than in the prevention of the diseases of infancy. The solution of the problem of reducing infant mortality lies in the education of the public; in the instruction of mothers, present and future.

A further step in this direction has recently been taken by the New York Department of Health, which has appointed six physicians to lecture to mothers and older girls at the "Vacation Playgrounds" and the "Playgrounds for Mothers and Babies" established at a large number of public schools during the summer. From the very beginning it was apparent that as much, if not more, could be accomplished by instructing the older girls as mothers. They all attend school, understand English and comprehend readily. Many of them are compelled to care for the baby during the greater part of the day. The mothers stand in awe of their superior intelligence, and will often listen to them when they would not listen to a physician, so that each girl is not only instructed herself, but instructs her mother, and possibly other mothers as well. The girls are proud of their newly-acquired knowledge and quickly correct mistakes which they see made at home. It would be advisable to continue such instruction, which requires very little time, during the regular school term, so that *all* would profit, not, as now, only those who visit the vacation playgrounds.

In the "talks" to mothers and older girls the importance of simplicity, brevity and clearness is constantly borne in mind. Headlines are prominent, the emphasis is placed on the important points, and details are omitted. The language is the very simplest —not a word is used that all cannot understand. The reason for doing each thing is given, and an appeal to their common sense is made. The principal items are repeated again and again. The "talk" lasts not more than twenty minutes, after which the mothers and girls are encouraged to ask questions. The "talks" are supplemented by demonstrations by nurses. The apparatus used is simple and inexpensive, such as they themselves can buy and use.

Infant feeding is a song of many stanzas, but the refrain remains always the same—"cow's milk is not woman's milk." The fact that breast milk is a hundred times better than any cow's milk is constantly dwelt upon, and brought home by stating that very few babies die on the breast, and fully ten times as many on the bottle. Those who are forced to use cow's milk are advised to get the small bottles at the milk depots, or, when this is not possible, to use the very simplest form of home modification. Almost all the methods usually given, although easy enough for a physician, nurse or intelligent mother, are too complicated for these mothers.

CHARLES HERRMAN.

Obituary.

It is with deepest regret that the Editor announces to the readers of ARCHIVES OF PEDIATRICS the death of one of our Collaborators, Dr. J. Park West, of Bellaire, Ohio, on June 25, 1908. Dr. West took an active interest in the journal and was a frequent contributor. The obituary notice that follows was written by one who knew Dr. West long and well, our former Editor, Dr. Floyd M. Crandall.

DR. JAMES PARK WEST.

In the death of Dr. West pediatrics has lost a practitioner and writer of unusual ability. The talent for drawing lucid and accurate clinical pictures from observed facts is not a common one. It was possessed by Dr. West, however, to a marked degree. The clinical observer will always be an important factor in the advancement of medical science. No observation of fact is wholly worthless, but facts of great importance may be of little practical value if left to stand alone and their relationship to other facts is not demonstrated. The men who can arrange observed facts in coherent groups and construct from a mass of symptoms a clinical entity are indeed rare. Dr. West's clinical work gave him a high position, and his death must be regarded as a loss to pediatrics.

In 1895, he reported in this journal a case of cretinism treated with thyroid extract, illustrated by two remarkable plates. But little was known of the treatment at that time, and the case as reported attracted world-wide attention. The plates were reproduced by several authors in this country, and at the request of editors or authors were sent for reproduction to England, Germany and Italy. In collecting and elucidating clinical observations made by Dr. Korell, he drew a picture of glandular fever as a clinical entity, which has been accepted for twelve years as the authentic portrait of that disease.

James Park West was born in St. Clairsville, Ohio, on June 27, 1858. He graduated from the Medical College of Ohio, at

Cincinnati, in 1882, and entered upon the practice of medicine in Bellaire, Ohio, where he remained until the time of his death, which occurred on June 25, 1908. His final illness was facial erysipelas, which ran its rapid and fatal course in four or five days.

Dr. West was always active in medical society work, and was a member of the Belmont County Medical Society, the Tri-State Medical Society, the American Medical Association, and the American Pediatric Society. Of the latter body he had been treasurer for several years prior to his death, and was held in high esteem. He was vice-president of the Bellaire Savings Bank, and during his whole career was an especially active and public-spirited citizen. He was widely known throughout Eastern Ohio as a pediatric specialist and his practice had long been a large and onerous one. His kindly and humane nature led him to a true but unostentatious sympathy for trouble in any form, and he is deeply and widely mourned as a faithful friend and *good physician.*

INFLUENCE OF SALT ON DROPSY IN CHILDREN. — Grüner (*Jahrb. f. Kinderh.*, Vol. XLVII.) tabulates the daily findings in 8 cases of dropsy in children, with the amount of salt and of fluids ingested and eliminated, the specific gravity of the urine and other details of the metabolism. They show the remarkable parallelism between retention of salt and formation of edema, and the prompt subsidence of the latter under the influence of partial or complete deprivation of salt. The fact of the retention of salt and its consequences has been fully established, he states, but it is difficult to explain its mechanism. Grüner accepts the whole process as a spontaneous means of regulating the osmotic balance. Both experience and theory, he declares, sustain the advantages of restricting the intake of salt in all cases of edema of cardiac or renal origin or tendency thereto. Restriction of the intake of salt is not always effectual in every case of existing retention of salt. Possibly the retained salt in these cases is combined with the albuminoids and tissue fluids in some way and is no longer in the form of a simple solution, and thus its elimination through the kidneys is prevented.—*Journal of American Medical Association.*

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, April 9, 1908.

DR. GODFREY R. PISEK, CHAIRMAN.

TWO CASES OF EXOPHTHALMIC GOITER IN CHILDREN.

DR. ELI LONG presented a series of cases of exophthalmic goiter which were of special interest, because the condition occurred in children who were born in this country, and who went abroad seven years ago to reside in the Black Forest, about a two hours' drive from Switzerland. They returned to this country two years ago, when it was noticed that the oldest child's neck had become enlarged. There was nothing in the history that was in any way significant, or that could be used as an etiological factor, except her residence abroad.

CASE 1. This girl was seventeen years old and showed beautifully the enlargement of the thyroid, while the exophthalmos was not marked. She had the fine tremor and a rather rapid heart action.

CASE 2. The next little girl, a sister, showed almost nothing, except a fullness in the neck. She had a pulse of 110, and the exophthalmos was not marked. The child was in the beginning stage of what her sister showed.

Another girl, a sister of the first two, showed almost nothing. Her pulse was between 84 and 88, while the mother of these children had almost as much exophthalmos as her children. Her pulse was slow, and there seemed to be no enlargement of the thyroid.

DR. JOHN ROGERS said that certain individuals, such as the patients under discussion, apparently possessed thyroids which, from hereditary or congenital conditions, did not contain as effective secretory powers as other individuals, and hence were more prone to be forced into overactivity and hypertrophy by the demands of general nutrition. Any therapeutics like an antiserum designed to check the activity of their thyroids, which was apparently physiological and compensatory, would be theoretically and practically wrong. Benefit could be obtained only by relieving the strain upon the nutrition by a quiet outdoor life and by supplementing rather than inhibiting the thyroid secretion, To do this medicinally some form of iodin, preferably the iodid of iron pills in 1-grain doses three times daily, should be given, and in addition a preparation of sheep thyroid nucleoproteid. A distinction was to be made between the mild forms of overaction of the thyroid shown by these cases, and the wasteful, destructive overactivity in true exophthalmic goiter. By placing these children under bad hygienic conditions, or by placing a severe strain upon their nutrition, their present condition could readily be changed to true exophthalmic goiter in which the overactivity of the thyroid must be checked, and it was not possible to distinguish with ease or certainty between the symptoms which might be considered physiological and those which were pathological. Nevertheless, more could be accomplished in these particular cases by helping out the thyroid than by interfering with the gland by surgical or antiserum treatment.

THE DISTRIBUTION OF BACTERIA IN BOTTLED MILK.

Dr. Alfred Fabian Hess read this paper. (See page 592.)

Dr. Henry L. Coit, of Newark, N. J., said that the subject discussed by Dr. Hess had opened up a new line of thought. The careful investigations recorded in the paper by Dr. Hess show that if contaminated milk must be used, much good can be accomplished by removing the top milk and using the under milk. In Europe, where raw milk is seldom used, they get rid of germs and toxins, too, by boiling the milk. Dr. Coit said that his method of infant feeding consisted in the use of clean raw milk for well babies. For sick babies he used milk that was cleaned by heating at low temperature, as taught by Freeman. Having seen many cases of tuberculous meningitis he felt that it was unsafe to use raw milk unless the cow was tuberculinized. A very large proportion of tuberculosis in infants was surgical tuberculosis, as seen in tuberculous adenitis, tuberculous ostitis, tuberculosis of the serous cavities, and was unquestionably transmitted by the ingestion of the bacilli. Any milk that Dr. Coit did not know he said he felt in duty bound to clean up; therefore, he used domestic pasteurization for all but certified milk. There was certified milk sold in New York City which contained as low as 400 bacteria per cm. Dr. Coit believed there were other things to contend with in market milk besides the bacteria. The presence of toxins was quite as offensive. He felt that a great difficulty in infant feeding was to be found in the milk sugar which was made from whey. Milk sugar was contaminated and contained bacterial toxins. The yellow color of the milk sugar was really due to impurities. The putrefactive bacteria found in the milk had been at work upon the whey before the first crystallization. The sugar on the market was from a second crystallization, which was necessary before the milk sugar was salable. Only after a third or fourth crystallization would sugar of milk be pure. Difficulties were encountered in artificial feeding from impure milk sugar.

DR. ELIAS H. BARTLEY, of Brooklyn, said that it was a well-known fact that cream contained many more bacteria than the original milk, and it was very interesting to figure out in this way the distribution of bacteria in the milk, and what Dr. Hess had presented was an ingenious suggestion for getting rid of the bacteria. He believed it was simply a question of numbers of bacteria that produced most intestinal disturbance. If one could reduce the number of bacteria by some simple device this would have a great influence in keeping the babies in a healthy state. The question arose in his mind whether the conclusion that they were all reaching, that a high fat content was essentially injurious, was correct, or whether a high bacterial count in the top milks was, perhaps, really the cause of part of the trouble. Years ago he learned that commercial cream could not be depended upon. He knew that the first 4 or 6 ounces from the top of the bottle of milk, when diluted, often gave fermentative troubles, so he used the upper one-half of the bottle, *i.e.,* instead of the 6, 8 or 10 ounces from the top, and thus obtained more proteid than he formerly used.

DR. JOSEPH E. WINTERS said that for more than a score of years he had fed babies in precisely the same way, namely, beginning with the top ½ ounce or 1 ounce from a quart bottle of milk. The results had been eminently satisfactory. The reason for this mode of feeding is that when the food is prepared for the feeding bottle, and after standing, it presents the same appearance as breast milk, when it has been allowed to stand in a test tube. On chemical examination, it is found to be practically identical with breast milk, namely, 4 to 6 or 7 per cent. fat, 1 per cent. proteid. When acidulated it presents the same physical behavior as woman's milk. It presents the same light, feathery, flocculent curd as woman's milk. This physical behavior of the artificial food is rendered a necessity by anatomical peculiarities, as the pylorus in a young infant is so narrow that it admits only the passage of a small probe and is surrounded by a protuberant, firm, muscular ring.

A baby on this mixture will be found to thrive in precisely the same manner and degree as a breast-fed baby does when fed at the breast of a vigorous, healthy, young woman.

Dr. Winters said he believed there was much exaggeration as to the conveyance of tuberculosis through milk. He believed there was much exaggeration as to the contamination of milk which is sold in New York City. The great watchfulness of the excellent Health Board of this city makes the sale of contaminated milk practically impossible.

Dr. Henry D. Chapin said that he did not believe in using cream in order to get certain fat percentages, because the cream was usually older than the milk and had a great many bacteria. Moreover, the fat content of the usual commercial creams was an unknown quantity. He preferred to use top milks, and with the percentage ratio of fat and proteid in these, the work of Dr. Hess would not interfere. It was astonishing that in every recent discussion on infant feeding there was always advocated either high fat or high proteid; they could not seem to get away from it. Dr. Chapin took the middle ground. He could not believe that whole milk was good for babies. He said he was specially chary in regard to accepting the conclusions drawn from the work of some workers abroad.

Dr. Rowland G. Freeman said that he was much interested in the work done by Dr. Hess, because he himself had worked on the same problem for several years, but had published only a preliminary report. Having been asked by a representative of the Bureau of Animal Industry of the Department of Agriculture to examine the butter and skim from a new butter machine which they were testing, he found that the bacteria of the milk were, for the most part, in the butter. He then examined gravity cream and the milk from which it had risen and found again in repeated experiments that some 95 per cent. of the bacteria were always above the cream line. While his experiments agreed with those of Dr. Hess, in that there were more bacteria in the upper layers of cream than in the lower, he has found much greater increase in bacterial contamination to take place at the cream line, there being very many bacteria just above the cream line and very few below. His results also agreed with Dr. Hess's, in that while most centrifuged milk also shows this separation of bacteria with the cream, that this was not always true. . In laboratory centrifugation the bacteria were always in the cream, but in some milk passed through a commercial separator no more bacteria were shown in the cream than in the skim.

His suggestions with respect to the practical application of these facts differed from those of Dr. Hess. Dr. Hess recommended discarding the top 2 ounces of cream, while Dr. Freeman has suggested the using of the skim milk raw and the pasteurizing of only the cream.

Dr. Charles G. Kerley said that the work of Dr. Hess was extremely interesting to him, in that it represented original work on the very old subject of milk. There had been a great deal of theory presented at different times, and it was very gratifying to hear something which represented carefully worked-out ideas. He believed that the work of Dr. Hess would be generally appreciated.

As to the matter of application of percentage feeding in infants, he thought that we had a pattern laid out for us in mother's milk. If well babies were to be fed satisfactorily, one must respect the nutritional elements as they were found in mother's milk; therefore, they must use percentage feeding, or, at least, think in percentage. In a discussion on infant feeding there are two points always to be considered: First, well children, and, second, sick children. To-night they were discussing the well children. With the well, theories of different kinds may work out satisfactorily, and good results will be obtained in a great majority of the cases. With children "digestively sick," however, theories were of very indifferent value. Each case had to be worked out according to its individual peculiarities. A man, to successfully feed infants with marked digestive disturbances, should be possessed of a great deal of mental flexibility. There was no one system of feeding that would apply to every case.

Dr. J. Finley Bell, of Englewood, N. J., said it seemed to him that we were up against two propositions—to either sacrifice the fats and accept the bacteria, or to sacrifice the bacteria and take a low fat mixture. He thought it wiser to sacrifice the bacteria and to accept a low fat mixture. In regard to the fat question, it seemed to him that the trouble was not one of total fats, but a question of the chemistry of the fats. If one took fat from the milk of a Guernsey or Jersey cow there would be a large percentage of stearin and a relatively small percentage of olein. This formed much larger globules, because the fat was much denser, and on this account would carry the bacteria to the uppermost layers of the cream more rapidly. It was rather interesting to note that the relative proportion of stearin and olein corresponded closely to the melting point of the fat, and the rapidity of the cream rise in the milk, and also corresponded to the fineness of the emulsion. The fat containing a large amount of stearin did not emulsify finely. It had been proven by physiologists that fat in fine emulsion was digested more rapidly than the fat in a coarser emulsion. It was the character of the fat in many cases that hindered the digestion of the proteids. This occurred in two ways: First, by coating the stomach with an insoluble fat which melted at a temperature higher than the child's; therefore, the function of the glands in the stomach were interfered with. Secondly, the milk was curdled in the stomach mostly by organic acids generated by reason of absence of HCl in the gastric juice, and the curds were coated over with this insoluble fat and so carried into the duodenum. The pancreatic ferments not being developed in the young infant, these curds were carried down into the intestine, where the fat underwent a splitting into irritant fatty acids with putrefaction of the proteids.

He asked Dr. Hess if he had made any observation in reference to the growth of yeasts and moulds in the milk. During a series of examinations in the measurements of fat globules, in milk from various animals some two or three years ago, it was demonstrated that yeasts and moulds grew in the top, but not the lower, layers of the milk.

Dr. Alfred F. Hess closed the discussion. He said, with regard to Dr. Coit's statement about always boiling the milk when he could not get good certified milk, that he thought Dr. Coit would get better results if he first took off the first 2 ounces and then boiled the milk. Otherwise, he would be boiling millions of bacteria, including, perhaps, tubercle bacilli, and feeding the baby with them. Even if boiled milk were to be used, he thought it best to remove the first 2 ounces and then boil it.

With regard to Dr. Bell's statement about sacrificing the bacteria or the fats, he did not think it was necessary to sacrifice the fats. If they took off 2 ounces, they still could have a milk with 3 per cent. fat.

With regard to yeasts and moulds, he said he had had no experience with them. He had not been troubled with moulds at all. He had not noticed that there were more on the cream than on the milk.

Transmission of Infectious Disease by School Books.—Hanson (*Norsk. Magaz. f. Laegevidenskaben*) gives the details of a small epidemic of an infectious disease among the pupils in a military school. He noticed that the infection occurred in bunches with certain intervals—corresponding to the return of the sick from the hospital. The lad first infected had been spending a vacation at home where his sister had the disease. No other cases developed until from three to six days after his return from the hospital to his schoolroom. Then 10 lads became infected and were sent to the hospital; no further cases occurred until about a week after they had been dismissed from the hospital, when another bunch of 5 cases developed. Every precaution in regard to disinfection before dismissal from the hospital and disinfection of the sleeping rooms had been taken with extreme care, but the return of a group from the hospital was always followed by the development of new cases. After this had been noted four times it was found that the lads had taken their schoolbooks with them to the hospital and had used them there and brought them back, without submitting them for disinfection. As soon as this was stopped the epidemic was arrested at once.—*Journal of American Medical Association.*

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, April 14, 1908.

J. P. CROZER GRIFFITH, M.D., PRESIDENT.

CHOREA.

DR. ISAAC H. JONES reported 2 cases, treated at the Children's Hospital in the service of Dr. Griffith. The first case was reported to show the rapid and satisfactory results from the administration of hyoscin hydrobromate hypodermatically in doses of grain $^1/_{200}$, grain $^1/_{150}$, grain $^1/_{100}$, after bromids had proved unsatisfactory. The second case a colored girl, seven years old, with mixed ancestry, was interesting from this fact, as chorea in the negro race is rare.

DR. GRIFFITH said that the first case had been under his care, and no words could well describe the violence of the movements. It was interesting to watch the excessively irregular movements of the diaphragm, as well as the difficulty which the child experienced in taking any food. The case was also an illustration of the value of hyoscin in this condition. He had seen but one severer instance of the disease.

DR. S. M. HAMILL could not recall a case of chorea in a negro.

DR. JONES stated that he could find only 3 cases of chorea in colored children among the records of the Children's Hospital for the last fourteen years.

DR. ARTHUR NEWLIN had seen 2 cases of chorea in colored children in the past year—one at the Pennsylvania Hospital and the other at the Orthopedic Hospital, in the service of Dr. Lewis. White blood was always to be found among the ancestors of these children.

VALVULAR HEART DISEASE WITHOUT PRECEDING RHEUMATISM.

DR. ALFRED HAND, JR., presented 3 patients with valvular lesions, none of whom had had rheumatism. The first was a boy of twelve years, who had had chorea several years before and had since been troubled with palpitation. On the day before admission to the hospital he was seized with pain in the abdomen and walked bent over, with the right thigh flexed. Fever and abdominal tenderness developed, and he was sent in with the diagnosis of appendicitis. On admission the abdomen was negative, except for slight tenderness on the left side. The heart was tumultuous in its action, and the murmurs heard were systolic at the aortic cartilage, transmitted into the carotids; diastolic at the same point, transmitted down the sternum, and soft systolic at the apex (secondary ?), transmitted toward the axilla. The radial pulse was decidedly water-hammer and the capillary pulse was so striking that it could be seen at a distance in each fingernail when the fingers were held widely apart. Salicylates controlled the initial fever and two relapses, which occurred after the drug had been stopped. While the incompetency of the aortic valves was the most marked feature at the start, there has seemed to be a gradual evolution, so that the stenosis has become more prominent, the thrill in the carotids being stronger, the diastolic murmur less pronounced, and the capillary pulse more difficult of demonstration. The X-ray plate, which was taken by Mr. Wilbert, of the German Hospital, showed clearly a great enlargement of the heart, in which the right side shared to a moderate degree, while the left ventricle was greatly hypertrophied, extending to the left thoracic wall.

The second case was a boy of ten years, who had a negative history up to six weeks before admission to the Drexel Home, when he began to have cough, night sweats and emaciation. Examination showed a double mitral murmur, with great epigastric pulsation and occasionally a systolic murmur of tricuspid regurgitation, although there had been as yet no edema. The X-ray plate offered quite a contrast to that of the first case, showing moderate hypertrophy of the left ventricle and great enlargement of the right side.

The third case was a girl, two years old, who was admitted to the Children's Hospital with a rather inflamed ulcer of the left arm, following a scald by hot tea. There was high fever, and auscultation revealed the presence of two systolic murmurs, one soft over the aortic cartilage, the other harsh over the pulmonic, the latter being transmitted under the left clavicle. For several days the temperature was hectic and a septic endocarditis was feared, but coincident with the internal administration of bichlorid of mercury the fever ceased and the aortic element of the murmur disappeared. The pulmonic stenosis was still present, but did not seem to affect the child's health in any way, and there was a possibility that it was dependent on some congenital lesion.

Dr. A. P. Francine spoke of the clearness of negatives taken with one of the newer X-ray machines, which were almost instantaneous in action, requiring less than half a second for exposure. He said that with such a plate one was able to see not only the position of the heart, but one was also able to get its change in position and size in systole and diastole. He said that in cases of aortic regurgitation he had been interested in examining the femoral vessels for the presence of Durozier's murmur and Traube's sound. The former occurred quite regularly, while the latter was much rarer. He had seen lately 2 cases in which it was present, both young adults around twenty years of age.

Dr. Griffith said that he had hoped to show a girl of nine years with pure aortic regurgitation this evening, but she was not well enough to be taken out.

Dr. Hand said that he had noted Traube's sound in these cases, but Durozier's murmur was not found.

THE CALMETTE, THE VON PIRQUET AND THE MORO REACTIONS.

Drs. Hamill and **H. C. Carpenter** showed 5 children who had been simultaneously tested with the conjunctival reaction of Calmette, the cutaneous reaction of von Pirquet and the ointment reaction of Moro. They briefly described the technique of the various methods, and pointed out that there was less alarm and resistance on the part of the child to either of the cutaneous tests than to the eye test. The cases which they presented showed the various degrees of each of the reactions. They had been especially impressed in their work by the uniformity of the reactions. They not only secured all of the reactions in practically all of the cases, but the degree of the various reactions was the same in the individual cases. They had quite a high percentage of complications with the conjunctival test, the most serious being phlyctenular conjunctivitis and keratitis. In 1 case a central ulcer of the cornea resulted.

The fact that the eye test had shown absolutely no advantages over the cutaneous tests and, on the other hand, had shown the disadvantages mentioned, made them conclude that the test was too dangerous to justify its general use. The eye inflammations come quite some time after the instillation of the tuberculin. One case developed nine days after an instillation, which had not produced a reaction. This had been observed by Van Durme and Stocké. They were inclined to trace a similarity between this old eye reaction and the late cutaneous reaction of Daels. They thought the condition due to particles of dead bacilli in the tuberculin. They even professed to observe a difference in the clinical appearances between these cases and those of ordinary phlyctenular keratitis.

Dr. Carpenter added that they desired to present these reactions simply as "card specimens," illustrating the uniformity with which the Calmette, the von Pirquet and the Moro reactions occurred. He preferred the Moro reaction, as with this reaction it is impossible to have any complications.

Dr. Francine said that he had made use of both the von Pirquet and the Calmette reactions, and considered them of particular value as methods easily applicable to the general practitioner should they eventually prove to be specific, which seemed highly probable. He referred to the uncertainty of the tuberculin solutions, in that there was no laboratory method of standardizing them. Solutions have had to be standardized by the clinician, so far. He believed that a larger percentage of these cases that reacted were tuberculous in the sense of having latent or healed lesions and was, therefore, inclined to agree with Mainini, who had shown, as had von Pirquet and Wolf-Eisner, that a much larger percentage of apparently healthy individuals react to the skin test than to the ophthalmic test. He mentioned the claim which seemed to be well founded, that the skin reaction was more searching and reacted to latent or healed tuberculosis, while the eye test was limited to response to active tuberculosis. Certainly in his own series four-fifths of the cases did not have pulmonary tuberculosis, though they may have had a latent glandular infection. He mentioned the claim that the skin reaction gives about six times higher percentages in non-tuberculous individuals than the opthalmic reaction, and that this was possibly due to there being more specific substances in the skin than in the conjunctiva.

Dr. Hamill said that the searching effect of the von Pirquet reaction is due to the dosage used. He was getting a very high percentage of reactions—85 per cent.

BRACHIAL BIRTH PALSY.

Dr. Arthur Newlin showed this child, at whose birth the head was delivered with some traction and there was difficulty in delivering the shoulders. A few hours after birth the parents noticed that both arms hung loosely by his sides. Within twenty-four hours the left arm had recovered and the child had since had perfect use of that member; the right arm had remained totally paralyzed. The forceps had also bruised the right side of the neck, just below the lobe of the right ear.

Examination showed a fairly nourished child, with some induration of the skin and subcutaneous tissues below the right ear. The right arm hung flail-like by the side. Handling the part seems to cause pain. There was no evidence of fracture. The arm was flaccid, the tissues flabby, without the normal tone, which could be felt in the muscles of the left arm. The appearance of atrophy was marked by subcutaneous fat. The interesting points seemed to be the complete paralysis, indicating extensive laceration or stretching of the brachial plexus, the condition being due to traction and not to direct pressure; and the absolute flaccidity of the whole group of muscles from the shoulder to the finger tips.

ANAPHYLAXIS TO HORSE SERUM.

Dr. A. Parker Hitchens read this paper.

HYPERSUSCEPTIBILITY TO HORSE SERUM IN MAN.

Dr. B. F. Royer read a paper with this title.

Dr. Hitchens then gave a practical demonstration of anaphylaxis upon several guinea pigs.

These papers were discussed by Drs. D. H. Bergey, Francine, Hamill, Hitchens and McKee.

The Use of Tuberculin in Infancy.—F. Ganghofner (*Jahrb. für Kinderhk.*, Bd. 63, Heft 5). The experiments with tuberculin were made on 12 tuberculous children. The author began with injections of $^1/_{100}$ to $^5/_{100}$ mg. and increased the dosage slowly. The real treatment began with 0.1 mg., which he increased slowly to 0.12 to 0.15 to 0.18 mg., depending on the intensity of the reaction which was generally mild, the temperature rising only slowly. The injections were made into the back once or twice a week. In general, the tuberculin cure was well borne, and had no injurious consequences. Two cases showed favorable results. He recommends further trials with tuberculin, and says he is still undecided as to its curative effects.—*Der Kinderarzt,* November, 1907.

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, March 17, 1908.

J. W. VanDerslice, M.D., President.

Dr. May Michael read a paper on

RUBELLA: A REPORT OF AN EPIDEMIC OF EIGHTY CASES.

(See page 598.)

Dr. J. W. VanDerslice, in opening the discussion of this paper, said that he thought the erythema infectiosa not so clearly differentiated. He would like to ask Dr. Michael how many cases had specific symptoms to indicate the disease as a distinct entity. About Dukes' disease he was not clear. He believed that in the last epidemic in Chicago many cases were diagnosed as scarlet fever that were not scarlet fever. Whether or not they were Dukes' disease he does not know. Until that last epidemic, about a year and a half ago, he was strongly of the opinion that there was no Dukes' disease. But his experience at that time led him to think there might be a Fourth Disease.

Dr. Effa V. Davis thought that anyone who had watched an epidemic of contagious disease like measles or scarlet fever, in an institution where there is opportunity to study a large number together, must be impressed with the difficulty of making a diagnosis, because of the mildness with which the symptoms often appear in all these typical diseases.

Dr. Davis was particularly impressed with this point in caring for measles in the Boys' Home, where one dormitory had been infected and isolated. She was not quite sure that some of the children had the measles, so mild were the symptoms, and certainly had she not known they had been exposed she would not have diagnosed the cases as measles. She believed it quite possible that the same mistake may be made in all those diseases. Certain types of children resist those diseases and are strong and able to get through them with very mild symptoms. She thinks this true of scarlet fever, as in some instances the typical signs are absent where children have this disease. It is her belief that rubella and Dukes' disease, the Fourth Disease, are probably manifestations of this sort.

Dr. I. A. Abt said that the thing that always impressed him about German measles was its mildness, and the fact that one who has seen enough of both the true and the German rarely confounds the latter with the ordinary type of measles. The very mildness and the peculiar coloration of the German measles always assists in the diagnosis.

Dr. Abt had found the glandular enlargement of great assistance in diagnosis. In an isolated case one wonders what the disease may be; it resembles somewhat the ordinary erythema or the macular eruption. The glandular enlargement is not so marked as it is in the measles. It is also more widely distributed. The glands at the angle of the jaw are not as large as in ordinary measles, and those in the region of the occipital and in the cervical region are not so much affected. One will sometimes have enlargement of the axillary glands and of those in the bicipital groove.

What Dukes' disease is and what the German measles is, is merely a matter of speculation. Until there is some positive pathological knowledge and until the etiological conditions which cause the one or the other are known, any attempt at classification or differentiation is mere speculation.

Dr. Michael closed the discussion of her paper by saying that so far as the glandular enlargement is concerned, in all these children was found genuine glandular enlargement, of the anterior and posterior cervical regions, and axillary and inguinal enlargement, though it was not so marked as sometimes in severe attacks of measles. It was more diffuse and less marked.

Dr. Albert W. Myers read a paper entitled

CONGENITAL LARYNGEAL STRIDOR; REPORT OF A CASE APPARENTLY DUE TO AN ENLARGED THYMUS GLAND.

(See page 607.)

Dr. J. H. Hess opened the discussion of Dr. Myers' paper. All the cases Dr. Hess had seen developed somewhat earlier than he understood Dr. Myers to report—somewhere from the third to the sixth week. In an attack, which lasted nine months, he thought he was able to outline an enlarged thymus. In the others it was quite indefinite. Dr. Hess was under the impression that these cases cured themselves. The various treatments were tried with his patients, but no definite results could be ascertained.

Dr. I. A. Abt said that while he had always felt that congenital laryngeal stridor might be due to perversion of the function of the thymus, he never thought it was due to mechanical pressure or compression from a large thymus. He had had under his observation many babies with very large thymuses, some as high as 30 grams in weight. And even in those cases where the thymus was unusually large, there did not seem to be any stridor. Then, too, if there is compression of the trachea why should not one find pressure on other important structures in the upper portion of the thorax—on the arteries, the ascending vena cava, on the lungs or on the heart itself? He presumed other explanations could be cited.

Dr. Abt thought it would be interesting to watch this baby to see whether, as the thymus is shrunken artificially, some physical abnormality might occur, which would point in the direction of the function of the thymus, owing to its premature atrophy.

Dr. Myers, in closing the discussion of his paper, said, in regard to the age at which the stridor appeared, he thought most of the cases appear within the first ten days. In reply to Dr. Hess' suggestion, that these cases cure themselves, Dr. Myers said it is known that cases do clear up in as short a time as two months, yet the average time at which the symptoms disappear is the middle of the second year, about the age of eighteen months; that while shorter durations have been recorded, the latter is the usual period, and it seems desirable to shorten it if it can be done safely.

In regard to the physical signs, this particular case was especially easy to recognize, because the physical signs were so definite. One might say it could be enlarged lymphatic glands, but that is hardly probable. The signs of enlarged thymus in this instance were very definite and specific. Even where the thymus is sufficiently enlarged to cause stridor, it is not always demonstrable by physical sign, as was shown in 1 case operated upon by Rehn, where the suffocative symptoms were so marked that opening was made and the thymus removed. It is not the size or weight of the thymus that causes the difficulty, it is the shape. A very large thymus may not give rise to pressure on the trachea, while a small thymus of the right shape may give rise to definite symptoms.

With evidence of a large thymus and with as much distress, Dr. Myers said he did not feel justified in waiting for the condition to cure itself. These cases have been shown to be especially susceptible to broncho-pulmonary affections, and it seemed desirable to make an effort to clear up the condition.

It would be interesting, as Dr. Abt has suggested, to watch the child to see whether any disturbed function is evident. At this time the nutrition of the child is perfect; nothing more could be asked.

THE TREATMENT OF TRACHOMA. (GRANULAR CONJUNCTIVITIS.)—Von Elschnig (*Med. Klin.,* July 21, 1907). Acute conditions are to be treated by washing the eye hourly with a 1-5,000 solution of oxycyanate of mercury and by applications of ice-cold compresses three times a day. In the chronic conditions, squeezing out or excising the granules is recommended. As an after treatment and for removal of isolated granules, massage with a sterilized glass rod. If there is extensive scar formation, or where constant medical supervision is impossible, a 5 to 10 per cent. citrate of copper ointment is to be rubbed daily by the patient into the conjunctiva. Local applications of cocain, and especially of adrenalin, are condemned. For ulcer formation 10 per cent. orthoform ointment is approved.—*Der Kinderarzt,* November, 1907.

DANGERS OF INSUFFICIENT NOURISHMENT FOR INFANTS.—Variot (*Gazette des Mal. Inf. et Obstet.,* Vol. IX., No. 1-4) asserts that an infant should take one-seventh of its weight as its daily ration during the first few months. As there is not much difference in the amount of calories in human and cow's milk, the amount of each should be about the same. Defectively developed infants require even more food than the healthy in proportion. He has made a practice of watching the development of infants on a certain ration, and has thus established the average ration of one-seventh of the weight. With less than this the infant suffers from insufficient nourishment. In 1 case an infant vomited and was losing weight. The mother had very little milk. He gave the child sodium citrate to stop the vomiting and doubled the amount of milk, going from 300 to 600 gm. (9 to 18 ounces), and the child began to thrive at once. Loss of weight and vomiting are among the signs of insufficient nourishment, but this subject of inanition in infants has not yet received the attention it deserves.—*Journal of American Medical Association.*

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. L. C. AGER. DR. HENRY HEIMAN. DR. G. R. PISEK.

PATHOLOGY.

MORO, E.: FETAL CHONDRODYSTROPHY AND THYREODYSPLASIA. (*Jahrb. für Kinderhk.*, December 1, 1907, p. 642.)

The case observed by the author was a child four weeks of age, which, in addition to other symptoms, presented the following abnormalities:—

A marked disproportion between the length of the trunk and extremities (micromelia), a marked thickening of the skin of the extremities, in which numerous folds were visible, a relatively large head, a cretinoid physiognomy, and a thick, short neck. The thyroid was visibly enlarged; the isthmus and lobes were readily palpable. After three months' stay at the Anna Children's Hospital of Gratz, during which period thyroidin was administered, the child died of a bronchopneumonia. At autopsy, the cartilages and bones showed the characteristic changes described in chondrodystrophy and in rachitis. The most noticeable microscopic changes in the thyroid were the disappearance of the lumina of the glands. The outlets of the ducts were filled up with epithelioid cells. There was almost a total absence of colloid. The author thinks that these anatomical changes indicate a disturbed function of the thyroid, which was probably the primary cause of the characteristic changes in the bones and cartilages.

HENRY HEIMAN.

LEWIS, C. J.: THE BACTERIOLOGICAL DIAGNOSIS OF DIPHTHERIA. (*The Birmingham Medical Review,* August, 1907, p. 51.)

The writer describes at some length the methods of taking cultures, staining, etc., and also notes some of the well-known sources of error. He attempts a classification of the Löffler and allied organisms as follows: Two pathogenic bacilli—the Löffler and a pseudodiphtheria bacillus, both acid-genetic. Two nonpathogenic pseudodiphtheria bacilli, one acid-genetic, the other alkali-genetic. Fifth, the bacillus of Hoffmann.

The chief interest in the paper consists in the stand taken that the laboratory worker should have some of the clinical evidence before making a diagnosis. He states that the bacteriological findings should be an important factor in making a diagnosis, but that the final judgment rests with the practitioner and the health officer. L. C. AGER.

MEDICINE.

BING, ROBERT: THE VALUE OF THE V. PIRQUET'S AND WOLFF-CALMETTE'S REACTIONS IN CHILDHOOD. (*Berlin. Klin. Woch.*, March 16, 1908, p. 546.)

The applicability of the method of tuberculin injection for diagnostic purposes has always been more limited in children on account of the greater instability of their body temperature and the more intense constitutional effects. So the announcement of a new method, which combines simplicity with perfect harmlessness, was hailed as a great step in advance. In the Kaiser and Kaiserin Friedrich Kinderkrankenhaus, in the institution where v. Pirquet made his original observations, 241 cutaneous inoculations were made. Bing classifies the cases into (1) definitely tuberculous, (2) probably tuberculous, (3) nontuberculous. In the first class were placed those in which the existence of tuberculosis was demonstrated either by autopsy, by bacteriological examination, or by animal inoculation. Nineteen such cases were subjected to cutaneous inoculation, of which 14 gave a positive reaction, *i.e.*, 73.7 per cent. Of 36 cases of probably tuberculous children, 25, or 69 per cent., gave a positive reaction. Of the remaining 186 cases, in which no tuberculosis was suspected, 34, or 18.2 per cent., gave a typical reaction. Classifying the cases according to their ages, Bing found that in the first two years of life only 19.5 per cent. were positive, while between 12 to 14 years of age 56 per cent, reacted positively.

In the last 100 cases the Wolff-Calmette reaction was employed, in addition to the v. Pirquet, to determine their relative value and delicacy. In the first class (definitely tuberculous patients) there was but slight difference in the percentage of positive reactions. In the second class (the probably tuberculous) the difference was more marked—73 per cent. positive reaction by the v. Pirquet method, and only 40 per cent. by the Wolff-Calmette. In the third class (probably nontuberculous) the difference was still more marked, the v. Pirquet giving 13.1 per cent. positive reaction, while the Wolff-Calmette gave only 1.2 per cent.

The cutaneous method gives us evidence of the existence of a tuberculous focus anywhere in the body, while the Wolff-Calmette reaction indicates the existence of active tuberculosis, if not too advanced. The author, contrary to the experience of some observers, has found the conjunctival reaction to be quite severe. In his cases there was often seen a marked hyperemia, accompanied by fibrinopurulent secretion and blepharospasm, lasting about thirty-six hours. He is opposed to the use of a stronger solution than 1.5 per cent. The existence of scrofula is a contraindication to the use of the conjunctival method, as in scrofulous children the reaction is often very severe. Both methods are of great aid in the diagnosis of tuberculosis. A positive cutaneous reaction in early infancy almost always indicates the presence of tuberculosis, while a negative reaction, although not excluding it, makes its existence improbable. The cutaneous reaction is also positive if there is latent tuberculosis; the conjunctival reaction only when active tuberculosis is present. The conjunctival reaction must be used with great caution, as it is not entirely harmless. In scrofulous children it should never be employed.

HENRY HEIMAN.

SURGERY.

STONE, J. S.: ACUTE EPIPHYSEAL AND PERIOSTEAL INFECTION IN INFANTS AND CHILDREN. (*Boston Medical and Surgical Journal,* June 27, 1907, p. 842.)

In babies and young infants epiphyseal injuries may not be recognized, although they probably occur frequently. When severe, localized tenderness and some swelling are present. On account of the rich vascular supply infection is likely to occur. The condition is often seen after pneumonia and measles.

The author reports cases illustrating several types of epiphyseal infection depending on the anatomical character of the parts first affected.

These cases can be divided into, first, acute epiphysitis, resulting in sequestration of the epiphyses. Second, acute epiphysitis with perforation into the joints. Third, acute epiphysitis with perforation into the extra-articular tissues, forming an abscess. Fourth, acute epiphysitis with extension below the periosteum, producing a dissecting periostitis.

In the diagnosis reliance must be placed on the clinical history and physical examination. In infants the tendency is for the inflammation to spread outward, while in older children the shaft of the bone is more likely to become involved. In older children dissecting periostitis is relatively common. The negative value of the radiograph, *i.e.,* the absence of any advance lesion of the bone, is greater than the positive.

Scorbutus most often simulates acute epiphysitis; however, congenital syphilis should also be thought of. Even if pus is present in the joints, relatively little damage is done if drainage is established. The one indication is to drain freely. If the pus is found outside the bone, the bone should not be explored.

HENRY HEIMAN.

HYGIENE AND THERAPEUTICS

SAHLI: THE TUBERCULIN TREATMENT. (*Korresp. Bl. für Schweizer Arzt,* 1906, Nos. 12 and 13.)

Sahli writes about his experiments with tuberculin. He has used the preparations from Koch, Dengs and Beraneck. Beraneck's preparations seem to be the most useful. It is very important to use small doses in order to avoid fever and a general reaction. There are for sale thirteen different solutions of Beraneck's tuberculin. The injections are given at most twice a week. It is well to begin with the mildest doses, and then increase to larger doses. In case of a reaction the next dose should be only half as large as the last dose. An increase in the temperature of about $2^{3}/_{10}$ degrees must be considered as a reaction. Further symptoms are dyspnea, increase in the pulse rate and sleeplessness. If necessary, the treatment with the tuberculin should extend over many years. Tuberculin has a prophylactic effect and can be used in suspicious cases. Sahli is opposed to its use for diagnostic purposes, and believes that it is injurious, and that it has no value in making the diagnosis. Tuberculin is not a specific, but he believes it neutralizes the sensibility of the organism to the toxin.

G. R. PISEK.

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MODERN LABORATORY FEEDING AND THE WIDE RANGE OF RESOURCES WHICH IT PROVIDES.*

BY THOMAS MORGAN ROTCH, M.D.,

Boston, Mass.

Since the year 1891, when the attention of physicians was first turned to the methods of laboratory feeding, a great deal has been accomplished year by year in perfecting more precise methods of dealing with the nutrition of early life, the object always being kept in view of placing the subject of feeding in as simple and practical a way as possible before the medical profession and the laity. I have thought it worth while, after these seventeen years of careful study of the subject, to present to you what has been accomplished, and what a wide range of resources the modern laboratory methods provide. During the development of the question of percentage feeding, I have frequently been impressed with the difficulties which physicians have told me they met with when they found that they were not able, in some special case, to accomplish by these modern methods the favorable results they said they saw apparently follow the use of the various patent and proprietary foods. Notwithstanding these reports, to which I have always listened attentively and endeavored to explain in some rational way, I cannot but feel that there is nothing, after all, so mysterious in the at times successful use of these foods. The subject essentially deals with the nutrition of the infant as effected by all known food stuffs. The food stuffs which make up practically all possible foods can be classified under three headings—fats, carbohydrates and proteids. Any other substances which are used in concurrence with these food stuffs, such as water, mineral salts, alkalies and ferments, are merely added to facilitate the digestion of the above-mentioned compounds of food. However much, as special students of infant feeding, we may each know regarding the use of these three classes of food stuffs, there is no doubt that physicians, in general, as well as the public who employ these physicians, know very little about the vital principles of physiological chemistry, which are so interwoven with the whole question of infant feeding. The majority of physicians, for instance, after having made up their minds that they wish to carry out in their practice the principles which were first enunciated by those who believed in the exact method of feeding provided by the milk laboratories, have continued to prescribe on the same routine lines. They have done this without having taken the trouble to inquire whether the earlier ideas on the subject have changed or improved, or whether through means of the laboratories the latest advances in the physiological chemistry of digestion can practically be made use of in every-day practice, in cases where the infant is fed from laboratory products and by laboratory methods. On the prescriptions which emanate from the laboratories it has, indeed, for many years, been explained how the different classes of proteids can be prescribed and used, but this is about all, with the exception of writing for the various food compounds in percentages, that has been accomplished. I have, therefore, thought that the time had come when, for the convenience of physicians in general, the possibilities of what can be accomplished by a new and more advanced prescription card should be explained. I have also thought that besides writing for the percentages of fat, lactose and proteids, as has heretofore been done, we might go further and introduce, by means of an explanatory prescription blank, various new foods, thus showing the physician not only how to write for each food, or the various combinations of the food stuffs, but also to inform him what this writing of prescriptions really means. In order to do this satisfactorily, we should each one of us understand what possibilities there are in prescriptions. If these possibilities are understood, physicians will soon see that the use of the patent foods is entirely unnecessary, for even granting that success may follow their use, we must allow that none but the three classes of food stuffs above mentioned can be used, and that there is no new or unexplained virtue which they contain. The key to the whole question is that we should first understand what the constituents of these foods are. We should next investigate why, from their own peculiar combinations of food stuffs, the various patent foods are at times apparently superior in their results to the recognized laboratory combinations.

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* Read before the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 25, 1908.

This has already been done, and now all combinations of food can be obtained at the laboratories according to the individual practitioner's preference.

Beginning with the investigation of the fats, although we know it is the quality of the fat, as well as the quantity, which makes its use successful in the feeding of an individual infant, yet the only variation besides the percentage which it is possible to obtain at the present time is by using the cream from different breeds of cows, for it is well known that the quality of the fats differs markedly in different breeds. Thus, if we take as examples the creams from Holsteins and Jerseys, a number of differences can be noted. The emulsion of the fat is finer in the Holstein than in the Jersey; is much less easily disturbed, and is restored much more readily. It has not only been found that the calves of Jersey cows thrive better on the milk of common cows than on that of their own mothers, but that in the feeding of pigs a milk poor in fat has been found to be the best. The question of high or low fats in infant feeding I shall not enter into here, as I believe that each infant must have the percentage of fat given to it which is adapted to its own peculiar fat digestion; that the successful use of fats depends upon the knowledge of the individual physician of the especial case rather than on invariably using high or low percentages, and that, so far as the nutrition of the infant is concerned, a gradually increasing percentage of fat, according as it can be adapted to the digestion, is indicated, always enunciating that a percentage of fat higher than 4 is only necessary in very unusual cases. So many opinions have been expressed by physicians in regard to the method of obtaining cream for percentage use, and so much prejudice has been shown as regards the use of centrifugal cream, that it may be well to state that gravity cream, as well as centrifugal cream, can always be obtained at the laboratories, and that quite a number of physicians are accustomed in writing their prescriptions to signify their wish that in writing for their percentages of fat, it is to be understood that gravity cream should be used.

There are a number of variations possible and practical in the use of the different carbohydrates, and I have, therefore, thought it worth while to put in prescription form the various carbohydrates, such as lactose (milk sugar), maltose (malt sugar), sucrose (cane sugar), dextrose (grape sugar), and starch. The explanation of many of the successful results in infant feeding lies in the especial carbohydrate which it is possible to embody in the various preparations of food. It is now possible by laboratory methods to prescribe for and obtain any or all of these carbohydrates which, for so many years, have been used with greater or less success in the patent and proprietary foods. In order to understand why certain carbohydrates, for instance, such as maltose, should be rationally used instead of always using lactose, I would draw your attention to this table (Table I.), which shows the different kinds of fermentation and the relative rapidity of fermentation which the various sugars undergo, and I have arranged them in the order of their rapidity of conversion. For instance, in regard to the formation of lactic acid, lactose is very much more rapid in its conversion into lactic acid than are dextrose, sucrose and maltose. On the other hand, where an over amount of butyric acid is interfering with the digestion, it is well to know that maltose is converted into butyric acid far more rapidly than are dextrose, sucrose and lactose. As a result of a knowledge of these facts, we should appreciate that where there is an excess of lactic acid, maltose should be used rather than lactose and dextrose, while where butyric acid is overproduced, lactose is indicated rather than maltose or sucrose.

TABLE I.

* Table I. shows the kinds of fermentation and the relative rapidity of conversion which the different sugars undergo, arranged in the order of their rapidity:—

LACTIC ACID.	BUTYRIC ACID.	ALCOHOLIC.
Levulose	Levulose	Maltose
Lactose	Maltose	Invert sugar
Dextrose	Dextrose	Sucrose
Invert sugar	Invert sugar	Dextrose
Sucrose	Sucrose	Levulose
Maltose	Lactose	Lactose

Again referring to Table I., the table of the carbohydrates, we can see how easy it is, having once acquired a knowledge of the principal ingredients of the patent foods, to simply ignore them as not containing anything of importance beyond what can be provided more precisely and, certainly far cheaper, than when a bottle or can of these foods has to be bought in order to add the important part of any especial patent food to a milk mixture.

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* Work done by Aitchison Robertson, *Edinburgh Medical Journal,* March, 1894.

For instance, suppose that the physician finds that he has some, as he thinks, unexplained success from the use of a food of which maltose is the principal ingredient. He can then, in place of the lactose, which is so often prescribed in the milk mixtures, use maltose, and he not only is thus giving the infant exactly what has been of benefit to it in the patent food, but also can, by means of careful percentage prescription, determine and give the exact amount of maltose which is suited to the especial infant. The same may be said of preparations where dextrose seems to be indicated, for in this case, physicians have merely to prescribe a certain percentage of dextrose. When the question of another and important member of the carbohydrate group, starch, is to be dealt with, we should consider in what way this especial carbohydrate may be useful in infant feeding. Starch can be used for two purposes: (1) to render the precipitated casein finer by mechanical means, and (2) for purposes of nutrition. We should understand that, for the mechanical virtue of starch, it requires 0.75 per cent. starch to make the precipitate of the casein finer. For purposes of nutrition, each physician must decide for himself how early he considers it well for starch, as a nutrient, to be added to an infant's food, and according as he prefers to call into action the infant's amylolytic function before it has been fully developed, or to wait until such function has been practically developed.

We should also note that when starch is given as a nutrient, the maximum amount which can be prescribed for is represented by 1.30 per cent.

In the technic of dextrinizing starch, we should understand that it requires one hour for complete dextrinization, but that as in intelligently using the other food stuffs we should dextrinize a shorter or longer time, according to the requirements of the especial case.

In connection with this line of thought, I have shown in Table II. the assimilative limit in adults without an overflow of sugar occurring in the urine.

TABLE II.

Possible amount assimilated in twenty-four hours without overflow:—

Lactose	120	grams
Sucrose	150-200	"
Levulose	200	"
Dextrose	200-250	"

In this manner we can, for instance, where for the purpose of nutrition sugars are indicated, use more dextrose than lactose.

I have also shown in Table III. the changes which the carbohydrates undergo before their assimilation in the form of dextrose:—

TABLE III.

Starch is converted into dextrins and then into maltose.

One molecule of maltose is converted into two molecules of dextrose.

One molecule of sucrose is converted into one molecule of dextrose and into one molecule of levulose.

One molecule of lactose is converted into one molecule of dextrose and one of galactose.

Dextrose is the body sugar.

It is well to note also that glycogen, or animal starch, may be formed from dextrose in the liver, where it may be stored, and when needed, changed back into dextrose and then carried from the liver into the general circulation.

If, again, the physician wishes to predigest starch, he can simply signify in his prescription that starch is to be dextrinized, with the understanding that the laboratory will accomplish this with the ferment diastase.

From the above Table III. it will be seen that while the carbohydrates undergo many different changes, one of the final results in each case is dextrose, the only sugar which is capable of being assimilated in the body. Therefore, starch, as a food, undergoes more changes and requires more time for its final conversion than do any of the others. Also, if a carbohydrate be needed for rapid assimilation, dextrose would be the one indicated.

The separation of the principal elements of the proteids in prescribing them in the modification of milk for infant feeding, was a great advance in laboratory possibilities, and has now been accepted by many physicians as a notable addition in the prescribing of milk and in dealing successfully with infantile digestion. It has, in my experience, done away almost entirely with the necessity of using cereals to make the flocculi of the precipitated casein finer. This question, however, need have nothing to do with whether the physician is using such cereal for the purpose of nutrition. This dividing of the proteids accomplishes in much the most rational way the control of such cases as have difficulty with the digestion of the casein, and yet need a higher percentage of the total proteids for nutrition, since in this way of dealing with the proteids we can give exactly as much casein as is indicated in the special case, or rather as much as can be readily digested.

The following Table IV. shows the possible combinations of whey and casein which can be obtained by the milk laboratories in cases where the fat desired in the prescription is from 1 to 4 per cent. and the sugar from 4 to 7 per cent.

Table IV.

WHEY PROTEIDS. Per Cent.	CASEIN. Per Cent.
0.25	0.25
0.50	0.25
0.75	0.25
0.80	0.25
0.80	0.50
0.80	0.75
0.75	0.50
0.80	0.60
0.80	0.90
0.75	1.15

It should be noted that while in the former prescriptions emanating from the laboratories the word caseinogen has been used, casein has now been substituted for it. This change has been made for the following reason: Casein is a neutral organic compound forming both acid and alkali combinations, while caseinogen simply indicates that it is the mother substance of casein.

While in the past we thought that we were able to obtain .90 per cent. of whey proteids in our prescription, the chemist of the milk laboratory has now proved that we can be provided with no higher than .80 per cent.

If, as is sometimes the case, we find that, even with the small percentage of casein which can be obtained by dividing the proteids, the casein digestion is still weak, we can temporarily obviate this difficulty by peptonization. In writing our prescription for this purpose, we simply indicate whether peptonization should be carried to such an extent as to render the mixture more or less bitter, or not bitter at all. This is regulated by knowing that twenty minutes gives a decidedly bitter taste.

As so much in recent literature has been said about the introduction of citrate of soda in milk mixtures, it is well to say a few words about this salt before stating exactly what it should be used for, if it is used at all. I have given it a place on the prescription card as, in the minds of certain physicians, it really plays an important rôle.

Citrate of soda is not an alkali, although, so far as its results are concerned, it may take the place of an alkali in connection with the digestion of casein. Citrate of soda, when added to the milk, decalcifies the casein, and as a result the casein is not affected by rennet, and, therefore, forms with the acids of the stomach soft, friable flakes (of the buttermilk type) instead of tough curds.

When sodium citrate is used in place of the alkali, it requires 0.20 per cent. to each ounce of the milk and cream used in modifying to facilitate the digestion of the proteids, and 0.40 per cent. to prevent the action of the rennet, and to ensure the formation in the stomach of soft curds instead of tough ones.

While in health, it is usually not difficult to adapt the percentages of either a divided proteid, or, later, a whole proteid, to the digestive capacity of the infant, yet in certain abnormal conditions, most of us who have had much to do with the gastric disturbances of early life have found a more or less alkaline reaction of the milk mixture to be of aid in our treatment. There are two reasons for producing a greater or less alkalinity in a food mixture: (1) To favor the production of hydrochloric acid in the stomach, and to thus aid in the digestion of the casein. A moderate amount of alkalinity is sufficient for this purpose. (2) If we wish to relieve the stomach from all work in connection with the proteids, we must add sufficient alkali to suspend all action of the stomach on the proteids.

The amount of alkalinity prescribed, or the substances used to produce such alkalinity, should be such as the especial practitioner deems wise for the individual case. As, however, in the majority of the prescriptions which come to the milk laboratories, lime water and bicarbonate of soda are the alkalies asked for, I shall only mention these two ingredients, and describe what is supposed to be the reason for using them, and how they have been shown to accomplish the best results. If we wish to merely favor or assist the digestion of the proteids, an amount of lime water equal to 20 per cent. of the milk and cream used in the modification of the milk called for should be used. Fifty per cent. of the amount of milk and cream used in the mixture suspends all action of the stomach on the proteids. If the lime water is 5 per cent. of the total mixture, it gives a mildly alkaline food. If bicarbonate of soda is used instead of lime water, it requires 0.68 per cent. of the milk and cream used in modifying the mixture to favor the digestion of the proteids. Bicarbonate of soda 1.7 per cent. of the amount of milk and cream used suspends all action of the stomach on the proteids, and 0.17 per cent. of the total mixture gives a mildly alkaline food.

In connection with what I have said concerning the various carbohydrates which we can now make use of in a food, I have indicated how useless it is to use these patent foods, and it is of some significance to note that most of these foods have acquired their reputation by the use of various ingredients, of which the most common are starch and maltose. The makers of these foods have naturally used the carbohydrates since they are the easiest to deal with on account of their possibilities for entering into a food which will keep for some time when compounded. The notable lack of fats and proteids in the patent foods may be partially explained by the great objection to using these compounds, owing to the difficulty of preserving them.

I am greatly indebted to Mr. Frederic W. Howe, professor of physiological chemistry and dietetics in the State Normal School at Framingham, Mass., both for his explanation of the results of his work on the patent foods and in showing how their use can be done away with. Through Professor Howe I have been enabled to obtain from the laboratory still another addition to our means of facilitating the digestion of the proteids in cases of weak casein digestion, and also for inhibiting the saprophytes of fermentation in disturbances of the intestinal tract, notably in cases of fermental indigestion. This has been accomplished by means of the lactic acid bacillus. The action of this bacillus in reference to facilitating digestion can be stated definitely in the prescription if we recognize what is known of its physiological chemistry. We should know that .25 per cent. of lactic acid just curdles the milk. .50 per cent. gives a thick curdled milk, while .75 per cent. separates the milk into curds and whey. Whether we prescribe one or another of these percentages depends upon the taste and preference of the individual patient. These percentages represent the per cent. of lactic acid attained when the food is removed from the thermostat. When the lactic acid bacillus is used to facilitate the digestion of the proteids, these percentages represent the final acidity, as the process is then stopped by heat at this point. When the lactic acid bacillus, on the contrary, is used to inhibit the growth of saprophytes in abnormal fermental conditions of the intestines, the acidity may subsequently increase to a variable degree, as the process is not stopped at this point since it is desirable for the bacilli to be left alive.

The practical object of my suggestion to the laboratory authorities to adopt a new prescription blank, was not only to show the profession how unnecessary it was to encourage the owners of the patent foods, by buying what can just as well, and cheaper, be put up at the laboratories, but also to induce the average physician to make use of the more modern methods of treatment. For this purpose, I have advised explaining on the prescription blank what we are practically doing when we prescribe for our patients and how we can become familiar with the more delicate shades of treatment by using the technique which the laboratories provide for our convenience and aid.

As a summary, I would say that not only is there no practical object in making use of the patent foods when we can perfectly well prescribe whatever is of importance in these foods, but also that understanding exactly what the food stuffs in a particular preparation are, and what their physiological and chemical meaning is, we can, by intelligent prescriptions, aid in the development of a better system of infant feeding.

Although the experience of one individual must only be taken for what it is worth, it seems to me that many physicians will agree with me when I say that, in the future, it will be possible to accomplish in our cases of feeding, both in health and in disease, far more than has ever been done before, and I believe that, by using this prescription blank which I have brought to your notice, we shall gain much in the accuracy of our mixtures, in convenience, in simplicity and in lessening the cost of our mixtures of food.

NEW PRESCRIPTION CARD SUGGESTED BY DR. ROTCH FOR LABORATORY USE.

Explanatory.		*Per cent.*
(a) Gravity cream will be used instead of centrifugal, if ordered.	(a) Fats....................................	
(b) The maximum amount of starch possible in any prescription when used as a nutrient is 1.30%. It requires 0.75% starch to make the precipitated casein finer.	(b) Carbohydrates. Lactose (milk sugar) Maltose (malt sugar) Sucrose (cane sugar) Dextrose (grape sugar) Starch (b)	
(c) One hour completely dextrinizes starch.	(c) Dextrinize..................................	
(d) In case physicians do not wish to subdivide the proteids, the words "Whey" and "Casein" may be erased.	(d) Proteids......... Whey.................... Casein..................	
(e) It requires 0.20% of the milk and cream used to facilitate the digestion of the proteids, *i.e.*, the formation of a soft curd; 0.40% to prevent the action of rennet, *i.e.*, the formation of a tough curd.	(e) Sodium Citrate............................	
(f) Twenty minutes renders the mixture decidedly bitter.	(f) Peptonize..................................	
(g) It requires 20% of the milk and cream used in modifying to facilitate the digestion of the proteids. 50% of the amount of milk and cream used suspends all action on the proteids in the stomach. 5% of the total mixture gives a mildly alkaline food.	(g) Lime Water..... Per cent. of milk and cream.... Per cent. of total mixture	
(h) It requires 0.68% of the milk and cream used in modifying to facilitate the digestion of the proteids. 1.70% of the amount of milk and cream used suspends all action on the proteids in the stomach. 0.17% of the total mixture gives a mildly alkaline food.	(h) Sodium Bicarb.. Per cent. of milk and cream.... Per cent. of total mixture	
(i) Percentage figures represent the per cent. of lactic acid attained when the food is removed from the thermostat. When the lactic acid bacillus is used to facilitate the digestion of the proteids, the percentage called for represents the final acidity, as the process is stopped by heat at this point. When the lactic acid bacillus is used to inhibit the growth of saprophytes, the acidity may subsequently increase to a variable degree, as the bacilli are left alive. 0.25% lactic acid just curdles milk. 0.50% gives thick curdled milk. 0.75% separates the milk into curds and whey.	(i) Lactic Acid Bacillus 1. To facilitate digestion of proteids. 2. To inhibit the saprophytes of fermentation. When the lactic acid bacillus is not called for in the prescription, heat at...............F.... Number of feedings......................... Amount at each feeding..............ounces	

DISCUSSION.

DR. HOLT.—I regret very much that the paper which has been in preparation by Dr. Clarke and myself is not ready to be presented at this meeting and has to be presented by title. A good deal of the work done by Dr. Clarke is along the lines suggested by Dr. Rotch's paper. I will only state one of the experiments—that with lime water. The experiment was made to determine the effect upon the gastric secretion. He used plain milk diluted with water, with lime water, and with soda. The chief effect of the lime water appeared to be an enormous increase in HCl production which took place. (That was very evident when lime water was used.) Gastric digestion goes forward largely according to the amount of HCl present. In no single one of the experiments has there ever been found a deficiency of pepsin in the infant's stomach, but there has been found a great variation in the amount of HCl. The contents of the stomach were removed a half hour after the child was fed and the quantities of different ingredients taken, and these fluids were set aside in a test tube in a thermostat to see what further digestion would take place. He found that in a short time the process came to a rest, but that if more HCl were added it would go on until complete proteid digestion had taken place, showing that the problem was to increase to as great a degree as possible the HCl secretion. The results of these experiments so far indicate that probably the chief advantage of the lime water is that it greatly stimulates the secretion of HCl.

DR. CHAPIN.—It has been a great pleasure to me to hear this paper of Dr. Rotch's, inasmuch as it shows that he recognizes and wishes to apply scientifically the various diluents that many of us have found most useful. As far back as the Deer Park meeting, and later at Niagara, the papers I read on the subject of diluents were written with the same object with which Dr. Rotch has now prepared this paper, namely, recognizing that certain proprietary foods did in many cases do good to find if we could not, as physicians, utilize the good in them in a scientific way. These various food stuffs are valuable, not only from the standpoint of diluents, but from a nutritional standpoint, and that leads me to say that I believe the whole subject of infant feeding can only be satisfactorily discussed from the biological standpoint, not from a chemical standpoint exclusively, and that is the point I have made for quite a number of years. The possibilities and limitations of all plans of infant feeding can only be judged by biology, which means that you must understand the intestinal tract of various animals; that milks are not interchangable in any sense; that milks have a double function, a developmental as well as a nutritive function. The developmental function has been heretofore ignored. That is only one example of how careful biological inductions may help us in this subject of infant feeding.

DR. CAILLÉ.—Dr. Rotch's method is too complicated and really just as empirical as our simple methods of feeding for this reason: Let us assume that we have three test tubes and in one we place water and nitrate of silver and chloride of sodium in certain proportions. The chemist will be able to tell us the qualitative and quantitative end results. Now take the gastroenteric tract as another test tube; you place in a definite quantity of your food, your milk, fats, proteids, sugars and salts, but the secretions and bacteria are not always the same, and the motor efficiency of the digestive tract varies. There is no one who can tell us the end results under such conditions. Now, assume the gastroenteric tract to be invaded by pathogenic bacteria or infected, where is the brain that will tell us the end results? That is my difficulty in attempting to teach others a method of feeding which can be managed only in the hands of a few persons and which is at best empirical. I admire the scientific study of feeding, but I teach the practitioner practical methods.

DR. GRIFFITH.—I am a thorough believer in the principles and practice of percentage feeding, and I work on no other plan. At the same time it seems to me that every effort should be made to keep the matter *evidently,* as well as really, simple, if we expect the profession in general to follow it. The new formula-blanks, which Dr. Rotch presents, look a little complicated, although really not so.

DR. NORTHRUP.—One of the ingredients has scarcely been mentioned and that is the milk. I think it would be well to put into these feedings milk. One of the great triumphs of the laboratory, to my mind, has been that they have given us an object lesson in the production of a pure milk with a known fat content of unvarying degree.

DR. ROTCH.—I have always felt very grateful to the members of this Society for the way in which they have thoroughly discussed this subject. It shows that they are all interested in it, and that we are all working in the same direction. It speaks well for a subject that it provokes discussion. But we are a little inclined, I think, to wander away from the real principle. Of course, we know that the milk supply is the keynote to the whole situation and that we are trying to improve it all the time. The great improvement that has already been made is wonderful.

Remember that we are trying to learn which are the best instruments to work with, just as you would do with surgical instruments. I am simply taking up what I think is an advance in infant feeding, namely, why it is that some foods agree with babies better than others. Is it not an advance to learn why one of these is better than another? As to the alkalinity, I am not an exponent as an individual, but I am making use of our combined knowledge on the subject. Dr. Southworth, for instance, has given us the most advanced teaching as to alkalinity.

Again, Dr. Dunn can show case after case where this lactic acid feeding has not been unavailing. These cases have done better than any set of cases that we have previously treated.

Dr. Caillé says only a few persons know how to use percentage feeding; he is mistaken. There are many men who know how to use it and are doing so. No one should attempt to throw cold water upon these investigations. I do not ignore in any way the great possibilities of human milk. We are beginning to understand more and more why it is better than any modified milk, when it is good, but we cannot get it over and over again, and we should endeavor, when we cannot get good human milk, to get the best modification we can.

Dr. Jacobi.—I do not understand the difference that has been claimed between chemistry and biology. I do not see that there is any boundary line between the two. If there were we should not be in a position to speak of and study biological chemistry. We should not have the very efficient and learned journal coming regularly on the subject of biological chemistry. I do not recognize that boundary line, and therefore I think Dr. Chapin is not justified from that point of view in bringing up that issue. I believe that Dr. Rotch and Dr. Chapin work on the same basis. It is an increase in our knowledge of organic chemistry that we do not make this distinction any more. Biology cannot exist without chemistry; and biochemistry will become the biology of the future more and more.

Dr. Chapin.—I did not intend to put biology against chemistry, but to protest against putting a chemical value on foods to the exclusion of their biologic value.

Dr. Jacobi.—We should not forget that we cannot all work in the same line. There is not a man in the profession in America that has done more original work on just these points, the study of the chemistry and biology of milk, than our friend Dr. Rotch. There are two classes of men among us: those who do original work and those who have more critical minds. We have here a few who do original work; the majority of us, myself included, have only the critical mind. Let us be satisfied that both of these classes, and all of us here who belong to one or the other, have the same purpose in view.

Cow's Milk Containing Iron.—The cows are fed with a prepared fodder, which insures that the milk contains a certain proportion of iron. Schnütgen (*Berlin. Klin. Woch.*, Vol. XLIV., No. 47) reports from Senator's clinic 9 cases of debility in adults in which great benefit was apparently derived from ingestion of a quart of this milk daily.—*Journal of the American Medical Association.*

DIABETES IN INFANTS AND YOUNG CHILDREN.*

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It is not the object of this paper to attempt to throw new light on the general aspects of diabetes, nor to try to show any difference in the etiology, symptoms or pathology of the disease as it occurs in the young, from the condition as found in adults. I wish to emphasize, from the data relating to the occurrence of diabetes in infants and young children, its frequency, and almost invariably fatal outcome.

Because of our belief in its rarity, or our liability to omit that important part of every physical examination, the complete urinalysis, each of us may have had under our care unsuspected cases of this disease.

I shall discuss the possible importance of sugar abuse in the production of the condition, and bring to your notice the experience of others demonstrating the peculiarly short course of the malady. Whatever reference I may make to the *general* etiology, symptoms, and pathology have place in this paper only in so far as they lend completeness.

Diagnosis: Difficulty and Importance.—Diabetes in infants is also of extreme interest in point of diagnosis, for, although the figures for all ages give relatively very few cases below fifteen years of age, statistics gathered from the records of disease in *childhood* furnish us so many cases that we are led to the conclusion that diabetes in the young frequently escapes detection by the practitioner whose chief interest is in adults. The difficulty experienced in obtaining urine specimens from young children is perhaps partly accountable for this.

In discussing the practical points in connection with the diagnosis of diabetes in children, we must always consider the relation of diabetes to surgical conditions, its influence on the occurrence of traumatic lesions, and its effect on the course and prognosis of such surgical interference as these injuries may necessitate. Attention is frequently called to cases of glycosuria following head injuries. Redard has demonstrated this urinary condition in his general surgical experience. Although these patients showed transient glycosuria without any other diabetic symptoms, nevertheless they add their warning against operations upon cases of possible diabetic tendency. Krausch has found that the carbohydrate capacity is much diminished at the time of any injury and returns to normal only after several days have elapsed. This suggests the possibility of converting a mild or transient form of the disease into a more severe type by the shock of operation and anesthesia. Among diabetics, rapid spread of infections, due to the lessened resistance, is the rule, and therefore such operations as those for the removal of adenoids and tonsils should be undertaken on diabetics only when the need is urgent.

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* Read before Pediatric Section, Medical Society of the County of Kings, N. Y., May, 1908.

While arteriosclerosis and vasomotor disturbances do not play an important part in the cases occurring among children, still the acid intoxication and liability to coma following operative shock are very great in the young and modify much the surgical convalescence.

Definition.—In the light of our present knowledge we have to consider diabetes as a disease characterized by a deficient power of oxidation of both carbohydrates and fats, resulting in an increased percentage of glucose in the blood, and an excretion of sugar in the urine; and that the amount of sugar so excreted is an index of the reduced oxidation of carbohydrates; that the presence of, and amount of oxybutyric and diacetic acids and acetone in the urine express roughly the degree of diminution of fat oxidation, and that the condition is due either to the reduction or lack of a ferment normally produced in the pancreas, liver and muscles, or simply to some unexplained metabolic defect.

Literature.—Frequency.—The pioneer in the investigation of diabetes in children was Külz, who in 1878 collected 111 cases. At about the same time Reden wrote of 32 cases, followed by Stern with 117, and by Saundby with 159. In 1895, Wegeli published a very comprehensive article, including the above-mentioned papers and adding thereto 108 cases which he found in the literature up to the time of his own writing. This gives us a total of 527 cases collected by these five men during a period of seventeen years, 57 cases having appeared in more than one of the reports above mentioned.

Statistics vary widely as to the relative frequency of diabetes in the young. Thus, Pavy reported 1,365 cases of all ages, among which were only 8 under ten years. Prout collected 700 cases, of which 1 was under ten years. On the other hand, of Reden's 1,003 cases, 50 were below ten years, 47 between ten and fifteen years; and in Saundby's 2,011 cases, fifteen occurred in children below five years, 58 below ten years, 78 below fifteen years.

Although in New York City during the ten years from 1889 to 1899, only 14 deaths from diabetes were reported in children under four years of age, at about the same time Hagenback had no trouble in collecting a series of 77 cases, all of them under one year.

To sum up, Pavy, Prout and Meyer, taking diabetes as it came at all ages, found together only 11 cases in children, or less than one-half of 1 per cent. of a total of 2,240 cases examined. Reden and Saundby, working for records of the disease in childhood, reported, out of 3,014 cases, 394 cases, or over 13 per cent. occurring in children under fifteen years of age. The former figures support the general belief in the rarity of diabetes in youth. The latter argue strongly for the suspicion that many such remain undiagnosed.

Age.—An analysis of Wegeli's cases shows 29 occurring in the first eight years, 81 during the years from five to ten, and 42 between the ages of ten and sixteen years. We may state, then, with some reason, that the incidence of diabetes in infancy is greater than is commonly believed.

Sex.—In a comparison of sex, Pavy, Külz and Stern make the number greater in females than in males. Wegeli and Saundby believe the occurrence to be the same in both sexes. A review of all available figures indicates the disease to be more frequent in females in infancy than in adult life.

Etiology.—The importance of inheritance in the etiology of the disease is emphasized by Wegeli, Külz and Stern. In one series of 28 cases, 7 had a diabetic family history. In the cases in which I have found complete histories on this point, out of 8, 4 had diabetes in the family, and among these there figured one sister, an uncle, a cousin and three grandparents—in 1 case both being affected—with no signs of diabetes in the patient's own parents.

I have among my notes the following case which is significant in relation to this point of heredity. The paternal grandmother died of diabetes at fifty-four years, the grandfather of tuberculosis. Parents are living and well. The first child, normal and healthy up to the fifth year, died at six and one-half years of diabetes. Her illness dated from a severe attack of measles eighteen months before. The second child, now eight years old, is normal. The third child at four years developed diabetes, which was active for one year and has been latent for the past twelve months. The last child, normal and healthy up to four months ago, sustained at that time a severe and continued fright and nervous shock, and has since shown the symptoms of a mild diabetes.

That there exists, in all these cases of infantile diabetes, a condition at birth predisposing to a breakdown in the glycogenic function is probable; it is doubtful, however, that the disease is, strictly speaking, congenital, our only definite pathological evidence being that the changes noted in the pancreas are as often of the nature of a compensatory hypertrophy as of a structural or secretory deficiency originating in utero.

We find among the more important causes mentioned in connection with the diabetes of childhood a neurotic inheritance, trauma and acute infectious disease. I have seen no reference to the influence of race which is often noted among adults. Other factors so frequently associated with the onset of the condition, namely, chills, bad hygiene, rapid growth and dentition, can certainly exert only a secondary etiological influence. A case of lumbar Pott's disease is reported with all the symptoms of diabetes which cleared up completely on the reduction of the kyphosis. This is worthy of mention only as it cites a lesion related to the cerebrospinal tract, producing symptoms of true diabetes and not, as is more frequently seen, those of mere glycosuria.

Glucose Capacity in Children.—There is little to be found in literature bearing on the relation between the amount of sweets taken by children and the production of diabetes among them through overstrain of the glycogenic function.

Although the glucose capacity of adults, that is, the greatest amount which can be ingested at one time without the excretion of this sugar in the urine, has been well established at 100 to 150 grams, and is now being used as a test of the hepatic function by clinicians and many insurance companies, there is no data as to this capacity in infants.

In order to learn something of this, I have for some time been feeding to children varying amounts of glucose and examining the urine next passed. Two hours after eating, the bladder was emptied and the glucose given. Examination for sugar in the urine next voided, Fehling's solution being used, showed that children between three and five years had positive urinary findings after ingesting 30 grams; between five and ten years after 50 grams.

Before beginning this series of tests, I was of the opinion that the infant capacity was relatively low, and at first found many children who had positive Fehling reactions after taking from 15 to 25 grams of glucose. The averages of the total number of urinalyses showed so much greater ability to store the glucose that we were forced to the conclusion that children were quite as able to handle their sugars as adults.

The glucose capacity, then, for the first ten years, may be put at from 30 to 60 grams. As capacity is perhaps more directly commensurate with bulk than with age, it is interesting to note that a comparison of the average bulk for this age, *i.e.,* 36 pounds, taking the mean of the weights from one to ten years, and the average adult weight of 150 pounds, indicates a slight advantage in favor of the child's capacity.

Of equal importance in this comparison of infants and adult, is the fact that sugar or starches make up more (about one-half) of the diet for the first ten years, and less (about one-third) of the adult food. There is good ground for the argument that the child is better equipped for sugar digestion than the adult. In favor of this view stands the theory that the parenchyma of any body viscus, the liver for instance, is proportionate to its volume, and that in growth we have a hyperplasia of pre-existing cells rather than a production of new cellular elements.

Vierordt proves that the child is better provided with liver substance than the adult by his figures placing the liver as equal to 4.4 per cent. of the body weight at four years, and only 2.7 per cent. of the adult body weight.

Of more value, however, than experiments and theories which we have cited to show that the child can withstand relatively a little more sugar at one dose than the adult, that he has to do considerably more starch digesting to supply his body needs, and that for this he is equipped at birth with all the active liver cells that he is ever going to have and a bigger percentage of liver substance, is the practical experience of each one of us that overstrain of any sort is more easily produced in early life when none of the bodily functions have the resistance to external diversion from the normal which exists at maturity. Bearing both in mind, it seems reasonable to correlate the well known abuse by many children of all forms of sugar with the appearance of diabetes among them.

From 8 cases occurring in the practice of Dr. Holt, I have been able to obtain these facts, which are so significant as to lead us to believe that careful investigation of a number of cases would tend to show that this matter of the amount of sweet ingested has at least some part to play in the production of infant diabetes. Of these children, five were known to have been taking large amounts of sugar over varying periods of time. One, a girl of five years, had been taking for eighteen months liberal quantities of honey and jam every night, and for some time before the onset had eaten of these more freely than usual. The family history in this instance was negative. One, a girl of seven years, had free access to the candy box, it being not an unusual thing for her to eat a pound in two days; and another case had a record for some years of ½ ounce of sugar a day in addition to the sugar of her regular diet. Two others were said to have had a good deal, this probably meaning several times the amount that would be allowed by a careful nurse. The remaining three patients furnished no data on this point, but taken with the frequently reduced sugar capacity in children, even this meager evidence indicates that the relation of such excretory strain to the appearance of diabetes may be, in some cases at least, a very close one.

Symptoms.—The symptoms in youth offer us no peculiarities. Attention was drawn to the condition in a great majority of the patients by an increased thirst, usually accompanied by some change in disposition, beginning with fretfulness and disinclination to play or move about. Increase of appetite is likely to be marked only after the successful institution of a proper regime. Emaciation is, of course, marked in those patients that do badly from the start, but in others there may be no loss of weight, and in two that I have been able to observe there was some gain up to the advent of the intercurrent disease which terminated them fatally. The prominent early symptoms in the individual cases that I have collected have been: twice, thirst, pain, and tenderness over the region of the pancreas; once, a general edema and urticaria. The loss of knee-jerks I found mentioned in only 1 case. The reflexes are often lost or diminished, with the increase and decrease of the sugar in the urine.

In connection with my work at the Manhattan Eye and Ear Hospital, I have been frequently led to a suspicion of this condition in adults by the failure of an apparently healthy wound to heal. So in childhood, one should look carefully for evidences of diabetes in those cases which under the best conditions persist as victims of malassimilation.

The Urine.—The urine varies in amount between 700 and 7,000 c.c. in twenty-four hours, with a specific gravity of 1.020 to 1.040, the extremes in Wegeli's series being 1.008 and 1.070. These low specific gravities are interesting in connection with Hart's report of 50 cases of diabetes mellitus, chiefly in adults, in which the readings were between 1.006 and 1.018. The maximum amount of sugar in twenty-four hours was 1,240 grams, the average being about 4 per cent., and ranging between 6 per cent. and a fraction of 1 per cent. This sugar content fluctuated with the time of day, and with the ingestion of food, being lowest at night, highest about mid-day and again in the early evening.

The presence of albumin was variable. In Wegeli's cases it appeared in thirteen, and in almost all the fatal cases it was found before death, furnishing ground for his belief that its appearance is an indication of a rapidly fatal termination of the disease.

Without at that time recognizing their significance, Epstein first noticed the short, thick, hyalin or finely granulated casts which, later, Külz, Aldehoff and Wegeli came to consider as the certain forecast of approaching coma. In 20 patients these were found just before, or during, coma in urines that had previously been free of formed elements. The presence of acetone and diacetic acid in the urine was considered as a very grave sign and was mentioned in almost all of the recorded cases. Both of these bodies are, however, much more likely to appear in infantile than in adult urine. In grave cases oxybutyric acid may be present in large amounts. To neutralize this excessive acidity, the ammonia content of the urine is uniformly increased. Herter mentions a case in which a large per cent. of the total nitrogen was excreted in this form.

Acetone and diacetic acid, products of fat and to a less degree of proteid metabolism, have been found at times present in greater quantity than could be furnished by the food ingested, this suggesting that their presence is not entirely due to lack of carbohydrate and fat oxidation, but also to the breaking down of the body proteids. Their abundance is an index of the probability of coma, as they are increased in this condition many times, and easily reduced by the addition of more carbohydrate to the diet.

The Blood.—The blood in diabetes shows few and inconstant variations from the normal. There is usually an increase in the sugar normally present. Anemia is generally not marked in the early stages or in the cases of moderate severity. Bremer's test, depending upon the staining properties of the previously-heated smears, and Williamson's decolorization test are irregularly present and are of small diagnostic value. Several investigators, among them Körnchen and Coats, have written on the frequency with which the blood at postmortem examination is found to be loaded with fat in fine emulsion. Change in the number of leukocytes or variations in the differential count are not common.

Recently, some investigations have been carried on to determine the opsonic index in diabetes. A low index for the staphylococcus pyogenes aureus is so far the only finding, and simply emphasizes the already known low resistance existing in this disease. Hitherto, no relation has been found between the opsonins and the presence or absence of sugar or of the acids in the urine.

Although in many cases the heart is found to be normal, it is reasonable to expect the circulation to suffer considerably from the toxemia existing in diabetes. Estimates of blood pressure in adults suffering from diabetes seem to prove that the disease *per se* has no tendency to affect the pressure, but that the occurrence of the complications incident to it individually explain the hyper- or hypo-tension occasionally noted.

Duration.—The course of the disease is much shorter and more rapidly fatal in children than in adults. In general, the younger the child, the shorter the duration of the illness. Bogoras has in his records:—

14 cases with a duration of one month
19 " " " " " six months
3 " " " " " one year
1 case " " " " two years
1 " of longer duration

He does not give the ages of these patients.

In Tyson's entire experience he has seen only 1 case, that of a girl of twelve years, which made a permanent recovery.

Of Wegeli's 108 cases, 69 died while under observation; 6 recovered, and during the time for which they were followed showed no symptoms of relapse; 9 patients showed improvement and clearing up of all symptoms, but were not observed beyond three months, and their final outcome was unknown.

The diabetic condition is often interrupted by a latent period during which there is a suspension of all active symptoms, the patient appearing to be in perfect health or suffering only from a mild nutritional disturbance. A case that I was able to follow from onset to termination illustrates this phase. The patient was a girl in good circumstances, whose family history was negative and birth normal, and who was considered a strong, healthy child up to the age of four and one-third years. It was then noticed that she was drinking a good deal of water both by day and by night, and was becoming unusually irritable and easily tired. An attack of rötheln, followed by rapid emaciation, asthenia and further irritability, led to an examination which revealed 120 to 180 grams of sugar to the liter, a trace of albumin, abundant acetone, diacetic and oxybutyric acids, and a few casts. The urine reached the large amount of two to three liters daily. These conditions, with a diminution in the amount of sugar, lasted for two months without other material change, when all diabetic symptoms cleared up and for six months there was steady, though small, gain in weight, the child appeared as well as at any time previously, and urine examinations were repeatedly negative. At the end of this latent period, the child being then five years old, sugar, acetone and diacetic acid, with a trace of albumin, reappeared and persisted with slight general symptoms until she was seven and one-quarter years, when, after two years, in which the disease was entirely stationary and evidenced only by the urinary findings, death suddenly occurred after a short illness.

The case illustrates the long latent periods possible in the disease, and bid fair to prove an exception to the usual rapid decline accompanying the appearance of albumin, until at seven and one-quarter years her unexpected death occurred.

Thirteen cases, which I have collected from the recent literature on the subject, show:—

1 death four days after onset of symptoms
6 deaths three months " " " "
1 death eight " " " " "
1 " one and one-half years after onset of symptoms
4 deaths two and one-half " " " " "

Complications.—Reden, Leroux and Simon name as the most frequent complications tuberculosis, boils, pruritus and gangrene, the latter being relatively less frequent in childhood than in adult life.

The generally lowered physical condition of these patients makes the appearance of any complicating trouble of grave import, but the ever present and most difficult problem is the keeping the nutrition up to the highest possible plane, without overtaxing the digestive or excretory functions.

Pathology.—Evidence in the pathology of diabetes in general is varied, scanty and unsatisfactory. The findings in children differ in no way from those in adult cases. The majority of lesions found postmortem are due to changes secondary to nutritional disturbance, the exceptions being tumors of the medulla and vagi, primary liver disease, and calculi in the pancreatic duct.

Kidney lesions are noted by Anderson as a fatty and glycogenic degeneration of the epithelium; by Leroux and Liebens, as a parenchymatous nephritis. Jacquemet, in all his cases, found the kidneys congested and swollen. Prevost and Bunch argue for a swelling of the renal epithelium, but no actual degeneration. Leva, later corroborated by Epstein, found a hemorrhagic nephritis and epithelial degeneration.

Landmeyer described a peculiar degeneration of the epithelium, probably glycogenic, and Tichtnor later noticed the same condition, most frequently in cases that died in coma. In these nearly all the tubules were filled with a broken down epithelium and entirely closed off, showing at the bases of their cells large and small fat drops. Although the glomerular capsule presented the same conditions, there was found no interstitial fatty degeneration.

The pathology of the pancreas has been described by Leroux and Leva as a general atrophy of the gland in some cases, in others of the cellular elements alone. In twenty-six autopsies the former condition obtained in thirteen instances; the pancreas was large and hard in five; large and soft in one; simply congested in one; and normal in six.

These papers were published before attention was called to the islands of Langerhans by Opie and others, and, therefore, these lesions may have been overlooked. Evidence as to this particular lesion in the pancreatic condition in diabetes is, at present, divided between hypertrophy, atrophy and vacuolization of the islands of Langerhans.

Two cases are reported in which the pancreas was normal, although there was fatty degeneration in the heart, kidneys and medulla.

Röhrig reports a case which on postmortem examination showed only an occlusion, by calculus, of the pancreatic duct, which had produced behind the obstruction a cyst filled with pancreatic secretion.

The most common lesions of the central nervous system have been new growths and congestion and thickening of the meninges.

Treatment.—In the treatment of diabetes the aim of the physician is:—

(1) To maintain the bodily nutrition at its highest level by general régimé and feeding;

(2) To keep the excretion of glucose in the urine as low as possible;

(3) To keep the urine free from acids.

For the proper care of diabetes the following are necessary:—

(1) The determination of the type of case with which we are dealing; that is, the inquiry into whether we are to handle simply a carbohydrate incapacity, or also a deficiency in fat oxidation, as shown by acidosis;

(2) The discovery of that particular form of carbohydrate which will be best borne by the patient;

(3) A clear method, preferably graphic, of recording data by which exact information can be had of, and comparison made between, the following points:—

(*a*) The patient's weight;

(*b*) The amount of urine passed in twenty-four hours, and its specific gravity;

(*c*) The amount of sugar excretion;

(*d*) The quantity of the acids present in the urine.

Daily Régimé.—For the maintenance of the bodily nutrition, we have at our disposal general hygiene and care, diet regulation, and the use of drugs that will meet special requirements.

Regularity of régimé should be first insured by laying out a definite routine for each hour of the day.

The child should awaken and have the first meal, in bed, at a fixed time. He should remain in bed till mid-morning, and then be allowed to be up and out until the hour for the noon-meal, after which he should be well wrapped and made to rest quietly in the open air for at least two hours. He may then be given mild exercise, walking or driving if in good condition, or massage if passive exercise is better borne. Supper should be not later than 6 P.M. and bed at 7.

The sleeping room should be ventilated as for a tuberculous case. During his waking hours the child is to be interested, but not excited; during the resting time, he is to be left entirely alone. Care is necessary that the clothing be sufficient to keep him warm, but never enough to produce perspiration.

In a word, as much care must be taken to guard against waste of nervous energy and overtaxation of the heat centers from over or under clothing, and to provide proper fresh air at all times, as is used in regulating the diet. The care of such accompanying conditions as rickets and chronic digestive disorders is secondary, not even to treatment of the diabetes itself.

I have dwelt at such length on this phase of the treatment, because we have no cure for the disease itself. Carlsbad has enjoyed its reputation as a place where diabetes may be cured, only because of the benefit derived there from the carefully regulated daily régimé to which patients are subjected. In children we may look for much better results from this course than we could hope for in the case of an adult.

As to the type of case presented, much is learned from the first examination and urinalysis. The former will reveal perhaps a fairly-nourished and otherwise normal child in the early stages of the disease, without complications, of equable temperament and good training, or a patient already emaciated, spoiled, the victim of previous dietary abuse, rachitic, and with a worn-out, starved nervous system.

The urinalysis at once stamps the patient as one with a small percentage of sugar and no acids, or presents the reverse picture of greatly reduced carbohydrate capacity and power of fat oxidation; but it is for the subsequent analyses to reveal the amenability or obstinacy of the case to treatment.

Diet: Carbohydrate.—The discovery of the variety of carbohydrate best suited to the patient should be the first result of the institution of the diet. Semiweekly urinalyses and weights may show increasing carbohydrate tolerance with certain starches, and so indicate which of these is most easily handled.

The starches of oatmeal, potato and milk and such sugar as levulose, which is present in fresh fruit and honey, are sometimes found to have no effect in increasing the sugar excreted.

The patient should be put on a standard diet, suited to his age and condition, and as free as possible from carbohydrate. Then a supplementary diet consisting principally of that carbohydrate found to be best borne, together with the other allowable starches and sugars, should be held in reserve, from which is added more or less according to the varying carbohydrate tolerance shown.

Periods of complete, or nearly complete, abstinence from carbohydrate should be alternated with periods allowing a fair amount of starch and sugar, the latter best coming at such time as the sugar is low in the urine.

The most reliable sign that more sugar is needed is the presence of diacetic acid, as shown by the ferric chlorid reaction. When the reaction becomes marked, carbohydrate should be administered freely or coma is apt to appear.

Because of the monotony of the diet, the resources of the physician will be sorely taxed in providing enough legitimate variety to keep the older children taking their food well. I shall not attempt to go into the food lists, with their varying carbohydrate contents and caloric values, as this information is easily accessible to all.

If, in spite of all effort, the condition of acidosis supervenes, the administration of alkalies is indicated. Soda bicarbonate is to be given; by mouth in the usual case, intravenously in the event of coma. The amount of the drug necessary depends on the amount of the ammonia output in the urine. This averages from .5 to 1.0 gram in twenty-four hours, and may increase to 12 grams. As the quantitative tests for ammonia are rather beyond the reach of the usual office scope, we must depend in practice on the depth and persistency of the diacetic reaction for our warning that alkali is needed.

The ultimate result of this treatment has, however, not been very encouraging, indicating that possibly the acidosis is merely a symptom of some deeper metabolic defect giving rise to the toxemia, and that the coma is not due to the excessive acid alone.

There may be in the near future some additional light on the method of treatment by use of internal secretions through the work that is being done on the hormomes, notably that extract of the duodenal mucosa known as secretin; but at present we have no direct method of treating this malady and can get but little help from the use of drugs.

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THE OPSONIC CONTENT OF THE BLOOD OF INFANTS.—Amberg (*Journal of American Medical Association,* January 26, 1907) has tested the opsonic content of the blood in infants, breast-fed and otherwise, and in different conditions of health and nutrition. His results do not altogether support Moro's finding that the blood of breast-fed infants always exceeds in bactericidal power that of other infants; while the kind of food may exert an influence, other factors must enter into consideration. One of these appears to be the state of nutrition, but there are indications that there are still other factors that come into play in certain cases. While he admits the insufficiency of the data, he offers tentatively the following conclusions: (1) The opsonic content of the infant's blood does not seem to follow the rules laid down by Moro for the bactericidal power of the blood. (2) The average values for the opsonic content of infants' blood exceed those laid down by Simon for normal adults. (3) A distinct advantage seems to exist in favor of the breast-fed infant. This advantage does not seem to be dependent so much on the breast-feeding as such, as to some extent on the state of the nutrition of the infant and, perhaps, on the constitution.—*Boston Medical and Surgical Journal.*

RHEUMATIC AFFECTIONS IN CHILDREN.—A CLINICAL STUDY.*

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It is not easy nowadays to present new points in the rheumatic affections of children, but a clinical survey of a fairly large material may, nevertheless, serve to illustrate some matters that become clearer as more and more cases are studied. In the course of forty-one months I have been able to collect 113 cases of rheumatic disease out of a total of about 8,000 children. This seems a rather small proportion, until we resort to an age analysis, when the following result is obtained:—

Ages.	Total Children.	Rheumatic Cases.	Per Cent.
0-3 years	5,200	4	0.08
4-8 "	1,900	55	2.9
9-13 "	900	54	6.0

Thus is the rarity of this group of affections in infancy contrasted with a high frequency toward puberty. I must not omit to mention that doubtful cases have been rigidly excluded from these statistics; in particular many cases of valvular heart disease of probable rheumatic origin were left out because no history of muscular or articular pains or chorea could be elicited. At all events, it is evident that the rheumatic affections are among the commoner diseases of later childhood, ranking close behind the commoner infections and the ordinary disturbance of the gastrointestinal and respiratory tracts.

The distribution of the various types of rheumatic disease was as follows:—

	Chorea.		Endocarditis.		Rheumatism.		Total.	
	m.	f.	m.	f.	m.	f.	m.	f.
Chorea alone	4	5					4	5
Chorea and endocarditis	5	3	5	3			5	3
Chorea, endocarditis and rheumatism .	3	4	3	4	3	4	3	4

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* Read before the Section on Pediatrics, New York Academy of Medicine, May 14, 1908.

	Chorea.		Endocarditis.		Rheumatism.		Total.	
	m.	f.	m.	f.	m.	f.	m.	f.
Chorea and rheumatism	0	5			0	5	0	5
Endocarditis and rheumatism			21	27	21	27	21	27
Rheumatism alone ..					16	20	16	20
Total	12	17	29	34	40	56	49	64

All these phases of rheumatic disease are somewhat commoner in females; also, uncomplicated rheumatism is not the rule, more than two-thirds of the cases presenting some complication. This peculiarity alone is sufficient reason for paying especial attention to this disease as it occurs in childhood, where it is unmistakably a more serious affair than in adult life.

Of the 96 cases of rheumatism very few were severe, and many so moderate that only a slight involvement of one or two joints could be made out. Most of them were able to move about fairly well, though complaining of some pain. A number seemed to be purely muscular, but this was often doubtful on account of the extreme mildness of the symptoms in so many children. As a rule, treatment with the salicylates was rapidly effectual, but occasionally slight vestiges of pain persisted for months, finally yielding to the iodids or disappearing spontaneously.

In subacute cases, when only one of the lower extremities is affected, our chief diagnostic difficulty is the exclusion of articular tuberculosis; it is as well to admit at once that it will often be impossible to come to a conclusion on this point without repeating the physical examination after a week or two. This is readily explained by recollecting that a tuberculous arthritis must also have an initial stage, with ill-defined symptoms, only moderate pain and slight rigidity. The therapeutic test, namely, the administration of salicylates, will clear up many of these cases, but not all. As already stated, some undoubted rheumatic cases do not yield to this drug readily, and, on the other hand, the severity of the pain in joint tuberculosis may remit coincidently, or perhaps in consequence of the exhibition of one of these analgesics. I have had no occasion so far to employ vaccination with tuberculin as a differential test. Gonorrheal arthritis must also be excluded. One case of this showed the presence of polyarthritis (wrist and sternoclavicular joint) and a very pronounced improvement after a few doses of sodium salicylate. While the pain became trifling after a few days of this treatment, and the sternoclavicular lesion disappeared entirely, the swelling of the wrist persisted for months, with the characteristic gonorrheic appearance and a marked limitation of motion that was overcome only very gradually.

I would especially warn against making the diagnosis of rheumatism in infancy and early childhood. Still, I can report 2 cases of torticollis, aged respectively fourteen and sixteen months, who got well in a few days on small doses of salicylates. Schlossmann* gives a few cases of his own, some of which he admits to be uncertain, and cites quite a number of others from the literature. It is well to remember that other superficially articular affections, notably scurvy, resemble rheumatism, and a very painful joint in a baby is almost certainly not rheumatic. We must always consider a scorbutic, septic, tuberculous, gonococcic, and even pneumococcic† joint disease, before adopting the easy, but usually incorrect, diagnosis of ordinary rheumatism. On the other hand, it is of the utmost importance, in children of three years and over, to regard every slight muscular or articular pain with apprehension. In these cases an examination of the heart will often show cardiac lesion, where the clinical evidence of rheumatism is insignificant or even doubtful.

Two of my rheumatic cases presented purpura; both of them were complicated with endocarditis. It is worthy of note that of some half dozen cases of erythema multiforme and two of Henoch's purpura not a single one suffered from a cardiac lesion. Of Osler's‡ 29 cases of exudative erythema with visceral compliactions, thirteen were under the age of fourteen, and but one of these presented endocarditis. Other authors furnish similar reports. Heart lesions seem to occur exceptionally, as in most other infectious diseases. It is evident that purpura is not necessarily a symptom of true rheumatism, but may occur in the course of any hemolytic affection, and it is likewise more than probable that erythema multiforme is usually not a rheumatic disease, but an infection of a different nature. Those cases in which erythema is complicated with articular effusion and pain are puzzling, and will, for the present, remain so. I have encountered but two of these in the present series. I think it best not to class any of these cases as properly rheumatic in the present state of our knowledge.

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* *Monatsschrift für Kinderheilkunde,* March, 1903.

† Furrer. ARCHIVES OF PEDIATRICS, July, 1907.

‡ *American Journal of the Medical Sciences,* December, 1895, and January, 1904; also *British Journal of Dermatology,* Vol. XII.

I pass on to the cardiac manifestations of rheumatism. The cases ranged all the way from very acute to chronic and fully compensated valvular disease. Usually the mitral valve alone was affected, sometimes also the aortic. One of the aortic cases, George W., aged twelve years, in the course of time developed typical attacks of angina pectoris, a rather rare manifestation in childhood. The relative infrequency of pericarditis is shown by the observation of only 1 case in the entire series.

In some cases the child did not come to the hospital until severe precordial pain and dyspnea had developed; more often a subacute endocarditis gradually caused sufficient disability to warrant medical attention, which would never have been called for by such very mild rheumatic symptoms as were present. Commonest of all, however, were the instances of a chronic valvular affection of long standing, which had gone on for years without being suspected.

About 60 per cent. of all my cases presented an unquestionable cardiac lesion; a number, in addition, had so-called functional murmurs, without demonstrable hypertrophy or dilatation. Jacobi* has rightly warned us to regard all "functional" murmurs encountered in the course of rheumatism or chorea with suspicion; only recently Neumann† has expressed the opinion that impure heart sounds in early childhood are regularly the precursors of permanent valvular symptoms. I am convinced, by my own experience, that even if these obscure murmurs disappear for a time, they almost always recur and eventually become fixed at one or more of the regular valvular sites; later on distinct hypertrophy, with its inevitable accentuated diastolic sound, develops. I am not sure that Barbier‡ goes too far, when he says that most cases of rheumatism in children are complicated with a cardiac lesion; on the other hand. we all have seen individuals who suffered rather severely from rheumatism in early life, and still have an intact endocardium.

Two points seem proven beyond reasonable doubt: First, that the endocardium is the seat of election for the rheumatic infecing agent during early childhood, and that implication of the articular serous membranes becomes conspicuous only after the fourth or fifth year; secondly, that the prognosis of valvular disease, especially of the mitral valve alone, is far better than set down in the books. I have had septuagenarians under observation who certainly had had a mitral lesion since childhood; in such cases a family history of cardiac disease is rarely lacking; most of the members, however, survive to the age of sixty to seventy years. These patients invariably belong to the insidiously developing group mentioned above; compensation is rarely, or not at all, disturbed until after middle life. Often the examiner for life-insurance will be the first to mention the lesion.

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* *Medical News*, May 12, 1900.

† *Münchener Med. Woch.*, 1907, No. 8.

‡ Thirteenth International Medical Congress, Paris, 1900.

The usual story is that, at the first examination of the child, we can readily distinguish the murmurs characteristic of a fully-developed mitral stenosis and insufficiency, a slight hypertrophy both to the right and left, with an accentuated pulmonary diastolic note, showing that the process is not even recent. At this time, an aortic lesion may be quietly developing, and still give no symptoms, so that the diagnosis and prognosis may be more optimistic than is justified by the subsequent course of the disease. It is, in fact, well to be extremely reserved in regard to the prognosis of cardiac cases under the age of puberty. Compensation is easily established in young children, but also easily upset, and the danger of recurrences and exacerbations is ever before us until the age of fourteen to sixteen years, when conditions are apt to become more stable.

I have rarely observed a well-marked valvular lesion on the left side of the heart before the age of four years; nearly all earlier lesions seen by me, some half-dozen annually, were congenital and dextral. I am free to admit, however, that the anatomical diagnosis of these cases was not always satisfactory, though the circumstance that cyanosis is very frequently absent no longer weighs with me; fairly well compensated pulmonary stenosis often runs on for years with little or no cyanosis.

Sudden death is rare in children, but was noted in a case of purpura. This patient, Nathan R., aged eight years, had been suffering from a purpuric eruption on the face and extremities for months, when slight cardiac distress and a temperature of 102.6° brought him to the hospital. Articular pains were, and had been, insignificant. Examination of the heart showed an old lesion of the mitral and aortic valves, with the possibility of an additional congenital lesion as shown by a loud, blowing systolic murmur over the base. I must, however, mention marked accentuation of the second pulmonic sound in contravention of this hypothesis; the murmur referred to may have been due to the ulcerative endocarditis, which was certainly present, and to which he succumbed suddenly when apparently doing well. I am indebted to Dr. Koplik for the opportunity of following up this case in the ward. An autopsy was unfortunately refused.

It is hardly necessary for me to reassert the interrelation of chorea, endocarditis and rheumatism; only one-third of my 29 cases of chorea failed to show one or the other or both complications. I have taken care to exclude chorea that might have been of the degenerative type or due to fetal or infantile brain disease; one case, for example, Herman A., aged ten years, showed choreic movements that were not typical of the Sydenham variety, and was, in addition, mentally deficient and slightly deaf. The elimination of such cases, as well as those that are evidently allied to athetosis, is, perhaps, the most important matter in connection with the diagnosis and prognosis of chorea in children; it is often a difficult task to differentiate among these affections, and an experienced neurologist may be in doubt. In such cases a history of rheumatism or the demonstration of a valvular defect may fairly be employed as a diagnostic aid; none of my unquestionably degenerative cases, so far as I can recall, has been associated with either of these affections. Often the distinctive "wriggling" character of the movements of Sydenham's chorea will distinguish it from the other forms, in which there is more co-ordination and systematizing of the patient's contortions.

Tonsillitis has not been a strikingly frequent complication in my series, and as such fades into insignificance among the hundreds of cases of ordinary tonsillitis observed during this period. In the present state of our knowledge, this association of tonsillitis with the rheumatic affections is more interesting than practically useful; most cases of the ordinary sore throat of children probably do not belong here.

Prognosis.—Too little attention has been paid to the question of prognosis; the average practitioner is altogether too optimistic as regards this group of affections, which always should be taken seriously. The situation may be stated briefly as follows: The immediate danger to life is not great; still, 1 or 2 per cent. succumb either to heart failure from endo- and pericarditis or to exhaustion from chorea. Hospital cases give a worse prognosis than the milder types that visit the dispensary. Baginsky* had a mortality of 10 per cent. in a fairly large series, but representing, naturally, the most unfavorable forms of this disease. As to recurrence, the prognosis is not at all good; many of my cases returned with relapses, and no doubt many more subsequently turned up elsewhere. In the majority of recurrences we find a recrudescence of the cardiac lesion, but some children are more fortunate in suffering again and again from mild attacks of rheumatism with little or no endocardial involvement, which last and the intensity of the articular or muscular pains stand, as already stated, in no sort of relation to each other; every return and even visit of the child warrants a careful re-examination of the heart. Not until puberty can we notice any tendency of the cardiac condition to become practically stationary. We cannot, therefore, ever commit ourselves to a favorable prognosis before the fifteenth or even twentieth year: whereas, in adults, we can often gauge our patient's outlook fairly accurately for ten or even twenty years ahead.

To put it concisely, rheumatism in children is a most serious affection, the more so the younger the patient. The prognosis can never be stated to be good, often must be stated to be bad; still oftener doubtful with the prospect of permanent impairment of health and shortening of the expectation of life. No disease of children of the school age entails more disability in later life than rheumatism in its various forms; this is the more lamentable, as we are in possession of no prophylactic resources that are worth considering, with the exception of removal to a mild and dry climate, a measure rarely available even in well-to-do families.

Treatment.—In children, as in adults, the salicylates are our main resource in the treatment of rheumatism, but they are not infallible; many cases, clinically not in any way atypical, yield but slowly and imperfectly to this group of remedies. It must be remembered, however, that the most striking effect of these drugs is relief from pain, and severe pain is unusual in the rheumatism of early life. Of the various salicylates, I have found the sodium salt the most efficient, but its unpleasant taste and the anorexia it often causes incline me to prefer the organic salicylic compounds; salol, however, is not included among these, for the presence of the poisonous phenyl radical limits the dosage to an insufficient quantity. Rest in bed and immobilization are important adjuncts to medication and should never be omitted; warmth, applied in any convenient manner, is also useful, and should be kept up as continuously as possible. In subacute and chronic cases, tincture of iodin locally is of some little use. My experience with oil of wintergreen and mesotan is limited to my private practice and does not warrant enthusiasm.

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* *Berlin. Klin. Woch.*, November 21 to 28, 1904.

Endocarditis should be treated essentially with rest in bed and the local application of cold; cardiac stimulants should be reserved for contingencies. I have seen no effect from the salicylates that was distinctly either favorable or the reverse; they are certainly of no great prophylactic value. but, on the other hand, they can do no harm in moderation, and must be given when severe articular pains are present. Much harm has been done by the indiscriminate administration of digitalis, which undoubtedly does not favor the cessation of the inflammatory process, and deprives the heart muscle of that rest which is the prime indication in acute endocarditis; the myocardium is regularly more or less involved in the process, usually, indeed, more than the physical examination would indicate. Digitalis should be strictly reserved for deficient compensation in chronic heart disease, when an exacerbation can positively be excluded. In this country strychnin is a favorite heart stimulant and probably does no harm in moderate doses when stimulation is really indicated. I have, however, noticed that our European colleagues get on very well without it. The value of spartein and caffein is doubtful, especially as so many of our patients, even children, are already victims of the caffein habit when they come to us for treatment.

The treatment of chronic valvular and muscular heart disease is not properly a part of this paper, and I shall, therefore, pass it by without discussion.

Under the treatment of chorea I may remark that absolute rest in bed is certainly by far the most effective measure. The value of arsenic is becoming more and more doubtful, in my opinion as well as that of other observers; its employment is certainly quite empirical, and, I think, somewhat irrational in the light of our increased knowledge as to the nature of this affection. It seems to me that better results are obtained by antirheumatic treatment, but we must not forget that, with the enforcement of absolute rest, chorea is usually a self-limited disease, running a course of one or two months, so that many remedies might give the impression of effectiveness. The best results are obtained in the hospital wards, to which all the severer cases should be referred; ambulant treatment is never very satisfactory in chorea.

Of the climatic and balneological treatment of all these affections, I have said sufficient in another place,* and can add nothing from experience based on a polyclinical material. Any application of our present knowledge to the children of the poorer classes is rendered impossible by the total lack of facilities; thus one of the most effective of all our measures against chronic rheumatic affections, particularly in young subjects, fails through the lack of suitable provision.

111 West 85th Street.

RUMINATION IN A GIRL AGED THREE YEARS.—Dr. J. Comby (*Archives de Médecine des Enfants,* July, 1907).—The child, whose parents were neurotic but did not suffer from merycism, was born at full time, and enjoyed good health until the age of one year, when she contracted whooping-cough complicated with gastroenteritis. Later she suffered from constipation alternating with attacks of mucomembranous colitis. It was only about three months prior to her coming under observation that she was first noticed to bring back her food into the mouth. This occurred invariably a few minutes after finishing a meal, and was unaccompanied by any effort or pain. The food, after further mastication, was swallowed again, and, in the case of dessert and dainties, with evident pleasure. She was encouraged by her mother to spit the food out, but this she refused to do. This rumination would last for about two hours, during which time there was emitted from her mouth a disagreeable sour odor. The child was constantly in a state of hunger. Her general health was, however, good.—*Leonard Findlay, in Glasgow Medical Journal.*

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* *Climatic Treatment of Children,* 1907.

IMPERFORATE ANUS, WITH THE REPORT OF A CASE IN WHICH THE RECTUM COMMUNICATED WITH THE PROSTATIC URETHRA.*

BY EDWARD B. HODGE, JR., M.D.,
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John Hance, aged six days, was admitted to the Children's Hospital on August 28, 1907. He had been restless for several days and had refused the breast. The abdomen had become distended, and for the last three days he had vomited greenish-yellow material. There had been no bowel movement, but on urination some black material came from the urethra. The urine was greenish at the start and then became clear toward the end of micturition.

On admission the baby was greatly distended, restless and somewhat jaundiced. General condition was fair. There was no indication of the anal site. There was a sensation of bulging in the perineum when the child cried. No pelvic measurements were taken.

Immediate operation was done, with the child held in the lithotomy position on hot water bags. No anesthetic was used. From the history that the urine was at first discolored and then became clear, it seemed probable that the communication with the urinary tract was in the prostatic urethra rather than in the bladder. An attempt to make the end of a sound present in the perineum by passing it into the urethra and through the fistula, failed. A median perineal incision was made in front of the coccyx. At a depth of about one inch, the rectum was found as a distended, dark pouch. It was readily brought down and stitched to the skin. On incision a large quantity of meconium was evacuated. Suture of the rectum to the skin was completed with interrupted silk. Time of operation, fifteen minutes. Condition good.

The child was sent home to be nursed by his mother. At the dispensary next day he was in good condition. The jaundice was less, he had not vomited, and had passed much meconium. He was not brought back to the hospital afterward, and subsequent inquiry revealed the fact that his mother wished him to die and had refused to nurse him. He had lived for a week after operation.

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* Read before the Philadelphia Pediatric Society, May 12, 1908.

This case belongs in Stieda's[1] classification, under the heading "Atresia ani seu recti complicata cum communicationibus," the opening being, in all probability, into the prostatic urethra. This is one of the rarer types of imperforation, and in this instance brings up several interesting points.

Attention is again called to the necessity for the physician making a careful personal examination of an infant soon after birth. Early operation gives greatly increased chances of recovery. This examination should not be intrusted to the nurse or a relative. The late discovery of the defect in this patient was aided by the fact that, through the communication with the urinary tract, the napkins were stained with meconium. Operation as late as the sixth day, as in this case, would probably have been lifesaving had the mother nursed the child or brought it back to the hospital for feeding. This tendency to neglect the child must always be watched for, as the belief that the baby ought to die seems quite common. At the time I was not aware of this, and believed I was giving the child the best chance by sending it home to be nursed.

The diagnosis of the degree of development of the rectum is difficult to make before operation. It has, however, an important bearing on the depth to which the perineal dissection may have to be carried to reach the bowel. If the rectum is low down, bulging or fulness of the perineum may be seen or felt when the child cries. Evidence of communication with the urinary tract usually means that the bowel can be reached from below, but Codman and Jopson's[2] case and Kelly's[3] second case show how misleading such instances may be. De Beule[4] has called particular attention to deformities of the pelvis as indicating the degree of development of the rectum. He says that in the newborn the distance from coccyx to pubis is normally 6 cm., and between the tuberosities of the ischia less than 5 cm. Reduction of these measurements, particularly that between the tuberosities, ordinarily accompanies total absence of the rectum; if there is no reduction, it is a fair assumption that the bowel can be reached from below. Absence of coccyx or sacrum means that the rectum is not in the pelvis. These observations need further confirmation.

In the operation itself, several points are of importance. Anesthesia should not be used, as the bulging of the rectal pouch by the child's cries gives the greatest possible aid to the operator's touch and sight. The incision is from the coccyx forward in the median line. Additional lateral incisions should not be employed by reason of the damage done to muscles and nerves. More room may be obtained by resection of the coccyx and, if necessary, part of the sacrum. A sound in the bladder is of help at times. If the rectum cannot be brought down to the skin, its attachments to the coccyx and sacrum may be divided with scissors to obtain sufficient mobility. This procedure failing, evacuation of the bowel must be followed for some months by systemic dilatation to prevent contraction. Even under these circumstances, the outcome as to stricture and control is surprisingly good. The bowel has a tendency to approach nearer the skin surface, either by later development or through traction by the scar tissue. Cripps[5] reports very gratifying late results in a number of cases.

Where it is possible to suture the bowel to the skin, control is the rule and often appears early. The levator ani is almost always present, and the external sphincter frequently aids.

If the rectum is not found after extending the dissection well up in front of the promontory of the sacrum, inguinal colotomy may be done. This should be avoided if possible, as the great majority of cases do not survive it long enough to permit the later operation of perineal proctoplasty aided by a sound introduced through the colotomy opening.

A communication with the urinary tract, if present, often closes spontaneously. If this fails to occur, a subsequent plastic operation will be necessary.

Ashhurst[6] has recently reviewed the literature of the subject carefully, and has shown the great probability of being able to reach the rectum by the lower route in almost all cases. He says: "In only 3 out of 22 cases in which the rectum was not found by perineal incision, and which are reported in sufficient detail, would it have been impossible to reach the rectum by the lower route; in 11, in all probability, and in 8 it certainly, could have been reached by perineal incision." Of the 12 reported cases since his paper, 7 were opened by the perineum. Of the 5 inguinal colotomies, 1 (Senn)[7] was apparently primary. At a subsequent operation the rectum was easily reached from the perineum. In

Beck's[8] case, at six months of age, a sound in the colotomy opening showed the bowel one inch above the coccyx. In Codman and Jopson's case, a pouch joining the rectum with the base of the bladder was reached by the perineum; the opening from the bowel into this pouch was so small that no meconium passed, and a secondary colotomy was required. In Kelly's second case, the rectum occupied the usual site of the cecum, and so was beyond reach. In his third case, details are not sufficient in the absence of autopsy, though the bowel was not found at a depth of two inches. These last three patients all died. So, of the four colotomy cases recorded in sufficient detail, prolonged effort to reach the rectum by perineal incision would have been impossible in 2. Combining these figures with those of Ashhurst, we have 5 cases out of 26 in which the bowel could not have been reached from below. The best modern opinion seems to be that with the patient in fair condition and in the absence of marked pelvic deformity, perineal dissection should be carried well up in front of the promontory of the sacrum before resorting to colotomy.

CONCLUSIONS.

(1) Importance of immediate examination of the newborn.

(2) Perineal proctoplasty without an anesthetic is the operation of choice.

(3) Before resorting to secondary colotomy, careful search should be made for a dark pouch in front of the sacrum, keeping always in mind that in the great majority of cases the rectum can be reached from below.

(4) Suture of the rectum to the skin may be facilitated by severing sacral attachments.

(5) Care is necessary to prevent neglect and starvation of the patient by mother and family.

(6) With attention to after-treatment, late results as to stricture and control are good.

TABLE OF CASES.

I. *Atresia Ani seu Recti Simplex.*

1. Atresia ani simplex.

De Beule.—Perineal proctoplasty; recovery.

Buchanan[9].—Perineal proctoplasty; recovery.

Herman[10].—Perineal proctoplasty; death. Autopsy showed congenital occlusion of duodenum.

Kelly (Case 1).—Perineal incision; recovery.

Royster[11].—Perineal proctoplasty; recovery.

Small[12].—Perineal puncture; recovery.

2. Atresia recti simplex.

3. Atresia ani et recti.

Kelly (Case 3).—Secondary colotomy; death.

II. *Atresia Ani Seu Recti Complicata Cum Communicationibus.*

1. Atresia ani et communicatio recti cum vagina.

2. Atresia ani et communicatio recti cum vesica urinaria.

Beck, C.—Secondary colotomy and two perineal proctoplasties; recovery.

Codman and Jopson.—Secondary colotomy; death.

Senn.—Primary colotomy and secondary perineal incision; recovery.

3. Atresia ani et communicatio recti cum parte prostatica urethræ.

Hodge.—Perineal proctoplasty; death.

III. *Atresia Ani Seu Recti Complicata Cum Fistulis.*

1. Atresia ani cum fistula perineali.

2. Atresia ani cum fistula scrotali.

Kelly (Case 2).—Secondary enterotomy; death.

3. Atresia ani cum fistula suburethrali.

4. Atresia ani cum fistula vestibulari.

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Clinical Memorandum.

A CASE OF LOCULATED EMPYEMA IN A CHILD OF SIXTEEN MONTHS, WHICH TERMINATED SUCCESSFULLY WITHOUT RESECTION OF A RIB.

BY ALBERT E. VIPOND, M.D.,
Montreal.

Empyema is common in children, and when it does take place its most frequent cause is pneumonia. Rarely, however, do we find in a child of sixteen months a loculated empyema opening at the back of the chest.

On or about July 1, 1907, G. B., aged sixteen months, developed a severe type of pneumonia involving the lower lobe of the left lung. It ran a protracted course, the temperature remaining high for over three weeks. The child was a delicate little boy and his appearance raised the suspicion of tuberculosis. The last time that I examined the patient no signs of fluid in the pleural cavity could be detected.

He was brought to see me again on August 23d with the history that after the attack of pneumonia he improved rapidly, had a good appetite and put on weight. On Thursday, August 22d, a lump was noticed on the child's back, which came out quite suddenly, but had not increased in size since it developed.

On examination, I found the child pale, delicate-looking, but with no marked signs of rickets. Temperature, 100°F., pulse, 120, and respiration, 22. There was no cough. On examining the back a swelling was seen about half the size of a large cocoanut, covering a space which extended vertically from the third to the ninth rib and laterally from one inch to the left of the spine to the left midaxillary line. This swelling pushed the scapula out and spread below and to the side of that bone. During the examination the child began to cry and the swelling became considerably larger and the skin covering it quite tense. On palpating I got distinct fluctuation, and percussion gave a dull note.

It was quite evident to me that I was dealing with an abscess, but the question arose, What was its origin? All the rest of the chest, including the lung below the swelling, gave a normal note on percussion. Auscultation did not reveal anything abnormal.

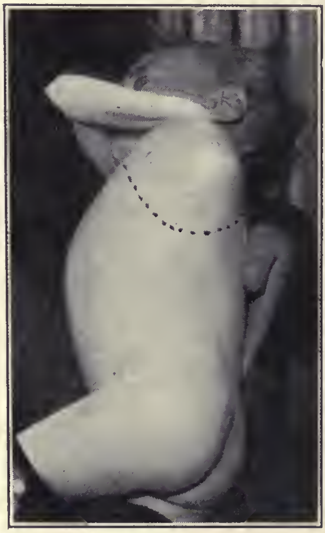
The abscess measured five inches vertically and four inches laterally. I made a thorough examination of the spine, ribs and scapula, but could not detect any trouble there.

A *diagnosis* was made of a postpneumonic empyema, which had been loculated and had ruptured between the ribs, producing an external empyema. I drew off some pus with an exploring needle, which, when examined, revealed pneumococci, staphylococci and pus cells. I based the diagnosis of the case on the following points:—

(1) The fact of the child having had a lobar pneumonia of the left lung a short time before.

(2) The sudden development of the swelling.

(3) The fact that the swelling increased in size when the child cried, pointing to a direct communication with the pleural cavity.



SHOWING THE SWELLING AND LINE OF DULLNESS TO PERCUSSION

(4) The absence of any disease of the bones to account for the trouble.

(5) The fact that the exploring needle brought away pus, which, on being examined, showed pneumococci and pus cells.

Treatment.—I decided that the first thing to do was to empty the abscess and to promote free drainage and, should the discharge not soon cease, to resect a rib. A large opening was made and about 1 pint of dark-colored pus came away; the cavity was then loosely packed with iodoform gauze and dressed twice a week. The discharge was quite free for about two weeks, but the amount became less daily, and by September 27th it had ceased altogether and the wound was entirely healed. The lung was normal in every respect and the child quite up to his usual condition. This case is of interest, for it demonstrates how a young child of this age may quite recover from an empyema without resection of a rib or ribs. Of course, in this case, the abscess was well drained; and another fact to be taken into consideration was that the child, being naturally of a very cross disposition, cried lustily many times a day, and this exercise expanded the lung and kept the abscess cavity well emptied, bringing the pleural surfaces near together. This is one of the few conditions in which a child should be encouraged to cry.

URINARY BACTERIAL INFECTIONS IN CHILDHOOD.—Box (*Lancet,* January 11, 1908) discusses descending and ascending urinary affections in childhood. He considers that the common cause of bacilluria is due to an ascending infection, a view which is corroborated by the sex incidence of the disease. It is twice as common in females as in males. The commonest infection is that of the colon bacillus. This bacillus is frequently present in the urine of children suffering from thread worms, which suggests that scratching may be in part the medium of infection. The clinical manifestations of infection of the urinary passages in childhood may be pyelitis, cystitis or incontinence of urine without obtrusive evidence of local inflammation. The possibility of the presence of pyelitis should always be borne in mind when dealing with cases of obscure fever in childhood, whether of a sustained, remittent, or of a relapsing character. Cystitis of a more or less acute character is not at all uncommon in childhood. In incontinence the course of the disease appears to be not altogether afebrile. Slight elevation of temperature at night, rarely over 100°F., may occur for weeks at a time. The cystitis of childhood, when caused by the colon bacillus, calls for a guarded prognosis. Some cases, especially those with acute onset and marked bladder symptoms, clear up under the simplest medicinal and dietetic treatment. Others, however, drag on sometimes for months. If, as the author believes, ascending infection is the cause of these conditions, the importance of frequent bathing and of the avoidance of urethral contamination from the anus as preventive measures cannot be overrated. Vulvitis should be promptly treated. The milder cases of cystitis, pyelitis and incontinence of urine do well with the ordinary treatment by full doses of potassium citrate, combined with sedatives of the belladonna group. The first care should be to determine the absence or presence of thread worms. The time to give injections for them, if found, is just after the bowels have acted. Drug treatment seems to be disappointing. Box does not appear to have had much success with serum therapy.—*Journal of the American Medical Association.*

CONGENITAL HYPERTROPHIC STENOSIS OF THE PYLORUS IN AN INFANT.—REPORT OF A CASE.*

BY JOHN DORNING, M.D.,
New York.

The following case of congenital hypertrophic stenosis of the pylorus is reported merely because it presents the typical clinical features of this now generally recognized disorder and hence may, with propriety, be added to the growing list of recorded cases of this interesting malady.

On May 29, 1905, I saw, in consultation with Dr. M. E. O'Donovan, of New York, Baby McG., seven weeks old, whose history is as follows: The baby was healthy and well developed at birth and weighed between nine and ten pounds. He had vomited since birth, usually after each nursing. On several occasions he did not vomit for a half day, but would afterward regurgitate a large quantity of sour material. He generally smelled sour. On the supposition that the maternal milk was the cause of the stomach disturbance, artificial feeding, consisting of the various infant foods, gruels and milk combinations, was substituted. For five days prior to my visit there had been less vomiting than usual. During these days the food was composed of arrowroot, 1 teaspoonful; whole milk, 3 teaspoonfuls, and hot water, 6 ounces, alternating with a weak solution of gelatin in water. During the past four weeks the vomited matter has been mixed with mucus. He never vomited bile. The stools have always been green, but there has never been any diarrhea. There has been progressive loss of flesh and increasing weakness.

Examination showed a very pale and greatly emaciated baby. The skin of face wrinkled and expression apathetic. The epigastrium was slightly distended. At short intervals a peristaltic wave, from left to right, was observed in the epigastrium. The abdomen was soft and there was no distention or muscular resistance. On deep palpation a nodule, about the size of a large bean, was felt in the epigastric region, just to the right of the median line. Examination of the chest was negative. With such a history and physical signs it was clearly a case of congenital hypertrophic stenosis of the pylorus. An operation was advised and emphatically declined. I then suggested irrigation of the stomach and a food mixture of whey, dextrinized gruel and cream. I did not again see the child, but the subsequent history obtained from the doctor was, that he was not permitted to irrigate the stomach; that the food suggested seemed to agree and was for the most part retained. There had been much less vomiting since our consultation. The child seemed to improve for about ten days and then gradually failed and died on June 16th. An autopsy was not allowed.

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* Read by title at the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 25, 1908.

While hypertrophic stenosis of the pylorus in infancy is a condition not frequently observed, still, in view of the many cases reported during the past ten or twelve years, it cannot be said to be a rare affection. It is well, however, to keep the malady in mind, so that an early diagnosis may be made and the little patient given the benefit of an operation before his vitality becomes exhausted. For with our present knowledge of this condition an operation is really the only measure that offers any hope of recovery in the majority of cases.

In an article, illustrated with a photo-micrograph of a section of an hypertrophied pylorus, published by the writer in the ARCHIVES OF PEDIATRICS, 1904, may be found a bibliography of the subject.

ACUTE PEMPHIGUS OF CHILDHOOD, WITH ESPECIAL REGARD TO ETIOLOGY.—A Longo (*Rivisti di Clinica Pediatrica*) gives an account of his experiments to determine the etiological factor in the production of acute pemphigus in children. It is generally admitted that the disease is contagious, and in the majority of cases in which the exudation from the bullæ has been examined staphylococcus aureus has been found. The occurrence in children so much more frequently than in adults seems to be due to the greater vulnerability of their skins. The author examined the fluid obtained from the bullæ of 4 children observed by him. In all of them he found a pure culture of staphylococcus aureus. The author concludes that the presence of staphylococci in the bullæ is not accidental, but has to do with the cause of the disease.—*Medical Record.*

ARCHIVES OF PEDIATRICS.

SEPTEMBER, 1908.

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Contributors and Correspondents, see page III.

PROGRAMME OF THE SECTION ON TUBERCULOSIS IN CHILDREN AT THE INTERNATIONAL CONGRESS.

The International Congress on Tuberculosis will be held in Washington, D. C., from September 21 to October 12, 1908. The work of the Congress has been organized in the following sections:—

I. Pathology and Bacteriology. II. Clinical Study and Therapy of Tuberculosis—Sanatoria, Hospitals and Dispensaries. III. Surgery and Orthopedics. IV. Tuberculosis in Children—Etiology, Prevention and Treatment. V. Hygienic, Social and Industrial and Economic Aspects of Tuberculosis. VI. State and Municipal Control of Tuberculosis. VII. Tuberculosis in Animals and Its Relation to Man.

The section work of the Congress will be done in the week

September 28th to October 3d. During that week there will be two general meetings, one on September 28th, the other on October 3d.

Section IV., on Tuberculosis in Children, has been organized with the following officers:—

President: Dr. Abraham Jacobi, New York.

Vice-Presidents: Dr. Isaac A. Abt, Chicago; Dr. S. S. Adams, Washington, D. C.; Dr. Wm. D. Booker, Baltimore; Dr. H. D. Chapin, New York; Dr. John M. Dodson, Chicago; Dr. R. G. Freeman, New York; Dr. F. Forchheimer, Cincinnati; Dr. J. P. C. Griffith, Philadelphia; Dr. S. McC. Hamill, Philadelphia; Dr. Alfred Hand, Philadelphia; Dr. L. Emmett Holt, New York; Dr. Francis B. Huber, New York; Dr. C. G. Jennings, Detroit; Dr. J. H. M. Knox, Baltimore; Dr. Henry Koplik, New York; Dr. J. H. Lowman, Cleveland, O.; Dr. H. M. McClanahan, Omaha, Neb.; Dr. C. W. Mitchell, Baltimore; Dr. John L. Morse, Boston; Dr. Wm. P. Northrup, New York; Dr. T. M. Rotch, Boston; Dr. John Ruhräh, Baltimore; Dr. A. H. Wentworth, Boston; Dr. Martha Wollstein, New York.

Secretaries: Dr. David Bovaird, Jr., 126 West 58th Street, New York; Dr. F. S. Churchill, 439 North State Street, Chicago.

As can be seen from the list of Vice-Presidents, every effort has been made to enlist the interest of the profession throughout the country and to secure their support. In like manner our colleagues in Europe have been kept informed of the plans for the Congress, and a number of them have been induced to participate in our programme.

The first meeting of Section IV. will be held at 3 P.M. on September 28th and will be opened by an address by the President, Dr. Jacobi. The provisional arrangement of the programme is as follows:—

MONDAY, SEPTEMBER 28TH, AT 3 P.M.

Address by the President, Dr. Jacobi.

Dr. L. E. La Fétra, New York: "Tuberculosis in Infants. An Analysis of 130 Hospital Cases, Etc."

Prof. Karl Oscar Medin, Stockholm, Sweden: "A Few Notes on Tuberculosis in Children."

Dr. Edgar P. Copeland, Washington: "The Relation of Infectious Diseases, Measles, Whooping-cough and Influenza, to Tuberculosis in Childhood."

Dr. Theodore Shennan, of Edinburgh, Scotland: "Tuberculosis of Lymphatic Glands."

Dr. Adoniram B. Judson, New York: "A Contribution from Orthopedic Surgery to the Study of Tuberculosis."

Dr. Edgar Green and Dr. A. L. Kotz, Easton, Pa.: "Report of a Case of Miliary Tuberculosis in a Child Aged Four and One-half Months, With a Report of the Autopsy Illustrated."

TUESDAY, SEPTEMBER 29TH, AT 10 A.M.

Dr. Woods Hutchinson, New York: "The Localization of Tuberculosis in Children."

Dr. Martha Wollstein, New York: "The Distribution of Tuberculous Lesions in Infants and Young Children. A Study Based Upon Postmortem Examinations."

Dr. D. Bovaird, Jr., New York: "The Relative Frequency of Abdominal Tuberculosis in Great Britain and the United States."

Dr. C. Y. White and Dr. Howard C. Carpenter, Philadelphia: "Cavity Formation in Pulmonary Tuberculosis in Children."

Prof. Edmond Weil, Lyons, France: "Tuberculous Peritonitis in Infancy."

Dr. Joseph S. Wall, Washington: "Tuberculosis of the Pericardium in Infancy."

Prof. Joseph Teissier, Lyons, France: "Concerning Intermittent Albuminuria in Children of Tuberculous Parentage."

TUESDAY, SEPTEMBER 29TH, 3 P.M.

Dr. Theodore Sachs, Chicago: "Children of the Tuberculous."

Dr. James A. Miller and Dr. J. O. Woodruff, New York: "The Occurrence of Pulmonary Tuberculosis in Children of Tuberculous Parents."

Dr. Cleaveland Floyd and Dr. H. I. Bowditch, Boston: "A Clinical Study of the Transmission and Progress of Tuberculosis Through Family Association."

Dr. Jules Comby, Paris, France: "Part Played by Human Contagion in Infantile Tuberculosis."

WEDNESDAY, SEPTEMBER 30TH, AT 10 A.M.

Dr. Gustaf Neander, Stockholm, Sweden: "An Investigation as to How Tuberculous Diseases are Spread Among Children in Primary and Infants' Schools."

Dr. J. J. Cronin, New York: "Obstructive Abnormalities of the Oro-nasopharynx, a Powerful Predisposing Factor to Tuberculosis in School Children."

Dr. A. S. Warthin, Ann Arbor: "Placental Transmission of Tuberculosis."

WEDNESDAY, SEPTEMBER 30TH, AT 3 P.M.

Dr. E. M. Sill, New York: "The Value and Reliability of Calmette's Reaction."

Dr. H. L. K. Shaw, Albany: "Experiments in the Ophthalmic Inoculation of Tuberculin."

Dr. L. Emmett Holt, New York: "Calmette's Tuberculin Diagnosis."

Dr. Henry Heiman, New York: "Clinical Observations on the von Pirquet Reaction in Children."

Dr. Henry D. Chapin, New York: "Comparative Value of Recent Tests for Tuberculosis."

Dr. Louis Fischer, New York: "The Diagnosis of Latent Tuberculosis in Children."

Dr. Frederic E. Sondern, New York: "Diagnostic Value of Lumbar Puncture in Acute Tuberculous Meningitis in Children."

Dr. Harlan Shoemaker, Philadelphia.

THURSDAY, OCTOBER 1ST, AT 10 A.M.

Mrs. Emily Noble, New York: "First Aid in Better Lung Development in Children."

Mrs. Henry Parsons, New York: "The Value of Children's Gardens in Congested Neighborhoods."

Mrs. Anna G. Spencer, New York: "Open-Air Schools."

Dr. F. L. Wachenheim, New York: "The Hygienic and Climatic Prophylaxis of Tuberculosis in Children."

Dr. S. A. Knopf, New York: "Overcoming the Predisposition to Tuberculosis and the Danger from Infection During Childhood."

Dr. Edmond Weil and Dr. Pehu, Lyons, France: "Prophylaxis of Infantile Tuberculosis at Lyons, by *L'oeuvre de Grancher.*"

Dr. Bertie Buhre, Stockholm, Sweden: "Care of Uninfected Children of the Tuberculous."

THURSDAY, OCTOBER 1ST, AT 3 P.M.

Dr. F. A. Craig, Philadelphia: "The Prognosis of Pulmonary Tuberculosis in Children under Fifteen Years of Age."

Dr. Noble P. Barnes, Washington: "Hygiene of Mouth, Nares, Pharynx, Intestine, Skin and Mucous Membranes; of Lymph Nodes and Lungs. Prevention of Colds."

Dr. Wm. P. Northrup, New York: "Air Treatment at Home."

Dr. J. W. Brannan, New York: "Sea Air Treatment of Tuberculosis of Bones and Glands in Children."

Dr. Willy Meyer, New York: "The Possibility of Avoiding Scar Formation in Softened Tuberculous Cervical Glands."

In addition to this special programme, the work of the other sections of the Congress presents many topics which will appeal to pediatrists.

The membership of the Congress has thus far fallen below expectations and every reader is urged to join and participate in the Congress.

There are two classes of members—active and associate.

Active members pay a fee of five dollars, and they receive, besides the ordinary privileges of membership, the full set of published transactions without extra charge.

Associate members pay a fee of two dollars. They do not receive the published transactions, or vote in the Congress. They receive the official badge, the printed matter distributed during the Congress and at the Exhibition; they share in the entertainments, attend the meetings, clinics, demonstrations, etc., and have the benefit of special transportation and hotel rates. Applications for membership should be made to Secretary General, John S.

Fulton, Room 810, Colorado Building, Washington, D. C. The report of the transactions will surely be worth much more than the cost of membership.

This Congress will undoubtedly mark an important epoch in the warfare against tuberculosis. The lines of attack, which thus far have been largely tentative, will doubtless be decisively determined and the plans of campaign worked out in detail. Great things should come from it, and the privilege of participating in it ought to be eagerly welcomed by everyone who wishes to have a part in the greatest conflict ever waged in behalf of the welfare of mankind.

David Bovaird, Jr.

Experimental Contribution to the Study of the Etiology and Pathogenesis of Rickets.—Antonio Iovane and Salvatore Forte (*La Pediatria*) have carried out experiments on animals with a view to finding out some of the etiological factors in rickets. Believing that intestinal autointoxication was one of the principal causes of the changes in the bones, they injected into animals watery and alcoholic extracts of the feces of babies suffering from rickets, dyspepsia and gastroenteritis, and produced in them disturbances of nutrition that seem to be identical with those found in rickets. The bony alterations were in outward appearance identical with those of rachitic children. The epiphyses were increased in size, and the long bones showed the same curvatures, the animals wobbling in their walk and the stomach hanging down to the ground. There was a marked softening in all the bones, the cartilage was thickened, and cartilage cells were found infiltrating the spongy bone. All the other histological lesions greatly resembled those in rachitic children. The amount of lime salts in the bones was diminished. The authors believe that one of the principal causes of rachitis is the absorption of the products of bad digestion. While the condition is not solely due to this cause and may result from several factors, this is an important one in producing it. They believe that the process is a sort of arrest of function in the forces which produce the transformation of materials into bone substance.—*Medical Record.*

Bibliography.

Traité Pratique de Thérapeutique Infantile Medico-Chirurgicale. By Drs. Paul Le Gendre and Aug. Broca. Second edition, completely revised. One octavo volume of 750 pages, with a formulary, a table of dosage and 170 figures in the text. Price 15 francs ($3). Paris: Published by G. Steinheil, No. 2, Rue Casimir-Delavigne, 1908.

Like many of the handbooks and practical treatises published recently, this volume has in the main an alphabetical arrangement of its contents. The first section of the book is devoted to a thorough discussion of the Nutrition of the Infant and of the various therapeutic measures applicable to infants, together with their indications and modes of administration. The second portion of the book is in reality a small cyclopedic dictionary of pediatrics. Beginning with "Abscess," it runs through the whole gamut of medical and surgical affections of childhood to end with "Xeroderma" and "Zona." Numerous cross-references aid both in preventing repetition and in approximating completeness.

Notwithstanding the endeavor to discuss thoroughly each subject mentioned, at times there is a failure, as with the topic of Pyelitis, for example. This is a fault common to all works arranged alphabetically, for in them all there is a lack of continuity of thought.

The portion of the work treating of General Therapeutic Measures is especially admirable, and the surgical discussions throughout are clear both as to diagnosis and treatment. The book can be recommended for ready reference.

New Formed Elements in Milk.—Kreidl and Neumann (*Wien. Klin. Woch.*, Vol. XXI., No. 7) state that study of the milk of various species with the microscope has shown the presence of innumerable small particles, in lively molecular motion, in the plasma of every specimen of milk, except human milk, in which none could be discovered. They call these little bodies "lactoconias," like the hemoconias in the blood. They are now studying the nature of this "milk dust."—*Journal of the American Medical Association.*

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, May 14, 1908.

GODFREY R. PISEK, M.D., CHAIRMAN.

DR. GOLDSTEIN reported 2 cases of

AMAUROTIC FAMILY IDIOCY.

These cases were discussed by Dr. Pisek.

HYSTERIA GRAVIS IN A GIRL OF NINE YEARS.

DR. SARA WELT-KAKELS presented Jennie S., nine years old, born in Russia. The family history revealed nothing of importance. Except for measles and an attack of dysentery, she had always been healthy. Her present illness dated back to October, 1907, when she complained of weakness of the legs, dyspnea and palpitation. She had spells in which she rolled her eyes, shook violently and screamed, but did not lose consciousness and never injured herself. There was no stupor or drowsiness afterward. The attacks occurred at first three or four times a week; lately more frequently. She complained of frequent headaches, lost her appetite and was rather constipated. She had been under the care of physicians, but had continued to grow worse.

She was a pale but fairly well nourished child. The submaxillary, anterior and posterior cervical and superficial lymphatic glands were somewhat enlarged. She had occasional grimaces slightly involving the frontalis and some muscles of the nose. The eyes were normal. There was no change in sensation. There were no tender areas. The abdominal and epigastric reflexes were lively. Babinsky's symptom was absent. The thorax was rather long and narrow and the movements of the thoracic walls during inspiration were rather subnormal. Nothing abnormal was revealed in the physical examination of the chest contents and abdomen. The changes in the abdominal contour were unique during inspiration; with each inspiration the abdominal contents were pushed out like a balloon; one would be inclined to suspect the presence of fluid in the abdominal cavity or a growth, but palpation and percussion showed nothing abnormal. Paralysis of the abdominal muscles was thought of, but the electric reaction proved them to be normal, and the examination with the fluorscope showed normal excursions of the diaphragm. This phenomenon had quite changed since the child came under observation; quite often there was associated with a protrusion of the wall of the abdomen a lateral rotation to the left. The urine and the blood were normal. In regard to the absence of stigmata, so-called, Dr. Welt-Kakels called attention to the fact that in 19 out of 29 cases, as reported by Thomas, of Boston, there were no disturbances of sensation. The smaller stigmata were frequently absent in these cases. The prognosis of hysteria in children was better than it was in the adult; as the cure was always the result of psychical treatment, children were more credulous than adults; were easier to be intimidated and more used to obedience.

A MONSTROSITY.

DR. HERMAN B. SHEFFIELD presented a picture showing the complete absence of anus, rectum, bladder, scrotum and one kidney. The photograph was taken of the baby born at full term, delivered by instruments. The breech presentation was noticed, but no anus was felt. There was no history of monstrosities occurring in the family. The child lived about six minutes after birth.

A CASE OF INFANTILISM.

DR. CHARLES HERRMAN presented this case. The patient was ten years old. The parents were both healthy. They had eight children, six living and all, with this one exception, normal. She had all her teeth. She began to walk when three years old and could talk a few words. The most striking thing about this child was that it was so well proportioned. There was no disproportion between the head, the extremities or the trunk. The child was merely a miniature one. At the age of six years there had been no symptoms characteristic of cretinism, but on the strength of its size and retardation and the condition of the head, the child was placed on thyroid treatment. The child then began to grow. In four months it grew 4 cm. The treatment then was discontinued for a long time—for over two years.

In June, 1905, when the child was seven years of age, intelligence was below the normal. A radiograph of the carpal bones showed only two centers of ossification in the wrist. The child was a subject of myxedema and was again placed under thyroid treatment, and then began to increase in size. She played and read simple sentences at eight and one-half years. The child was now able to add 6 and 5 and 4.

Dr. Herrman said he had reported another case of infantilism at the Harlem Medical Society. The interesting features in this case were the size and weight for a boy sixteen and one-half years old—71 pounds and 4 feet, 9 inches. He presented none of the signs of puberty and the genitals were undeveloped.

SOME CEREBRAL CHANGES FOLLOWING SCARLATINA AND MEASLES.

Dr. Max G. Schlapp reported 3 cases, 2 following measles and 1 following scarlet fever.

Case I. This patient was a boy eight years old. When one year of age he had an attack of measles; the attack began with convulsions. When he had convulsions he also went into a state of unconsciousness and delirium, remaining so for five days. After he came out of his unconscious condition the convulsions continued for three weeks, averaging about fifteen a day. After three weeks he recovered. He then had convulsions for two or three months. The last two years, however, the convulsions had been more frequent and more severe. During the past two weeks they had been coming on twice a day. They were typical epileptic convulsions, developing first in the left hand, leg and face. The weakness in the hand increased so that it was partly paralyzed. The leg was also weak and the muscles of the face as well. Dr. Schlapp found evidences of the motor area being involved, particularly of the arm, leg and facial area. He thought an operation would relieve the condition. Dr. McCosh operated, exposing the anterior and central convulsion. The cortex was found to be discolored. The areas were hard and felt firm.

Case II. This was a boy, sixteen years old, living in the city, who came to the hospital because of Jacksonian convulsions and weak mental condition. There was nothing in the family history of importance. The child was born with great difficulty. When one and a half years old he had an indefinite illness of three weeks, which was diagnosed as measles. He had attacks of unconsciousness and twitchings of the left side. The left hand was paralyzed and useless. At the age of two years he appeared to have recovered completely, and to be a normal child. At the age of two and a half he began to be fretful. The attacks then began with a sense of depression, twitchings of the left hand; then the child would fall asleep and sometimes he would vomit. These attacks occurred about once in from two to six weeks, and they gradually increased in duration up to the eighth year. They then became worse. Jacksonian epileptic attacks occurred, involving the left hand, leg and face. Because of the severe involvement of the hand and the spastic condition and the history of complete paralysis, he thought it advisable to go in and operate. He advised going in over the arm center. Dr. McCosh operated and again they got evidences of that hardened condition.

CASE III. This was a boy eight years old, who was brought to the hospital March 10th, and died on March 16th without regaining consciousness. This boy had had scarlet fever when three years old. During the acute attacks he had convulsions. He was unconscious and delirious for five days. After this these convulsions continued severely for two weeks, and then they subsided. The child then had about one convulsion in four or six months. The family history was clear. There were three sisters and two brothers in the family. At the autopsy an unusual condition was found. Evidently in his convulsive attacks he had fallen, struck his head and had a hematoma pressing upon the brain.

DR. SARA WELT-KAKELS said that three years ago she had the opportunity of reporting 3 cases of deranged mental condition following acute infectious diseases.

DR. F. L. WACHENHEIM said that they could not be too careful in making a distinction between these cases that had just been reported and cases of encephalitis. These psychoses were asthenic, the result of some disturbance caused by an infectious agent. The characteristic thing in encephalitis was that the convulsions or paretic attack might pass on to complete paralysis. The mental symptoms only appeared gradually.

Dr. Sheffield said he could not understand how the doctor could call these convulsive attacks complication or sequelæ of measles or scarlet fever. He asked Dr. Schlapp why such symptoms should result from attacks of measles and scarlet fever and why they did not follow other conditions.

Dr. Max G. Schlapp said that these conditions with gliosis were more commonly met with after measles and scarlet fever than after other infectious diseases. That might be because they were more common in children.

INFANTILISM AND ALLIED CONDITIONS.

Dr. Herman Schwarz read a paper with this title and presented a patient illustrative of the condition.

This paper was discussed by Drs. Sheffield and La Fétra.

The Management of the Umbilical Stump.—J. A. Harrar, New York (*Bulletin of the Lying-In Hospital of the City of New York,* September, 1907). In a series of nearly 10,000 cases it was found that separation of the cord occurred between the fourth to sixth day in 73 degrees of the cases; the small granulating core left usually heals over by the tenth day. Various deviations from the normal have been noted; of these, hemorrhage and umbilical hernia are the most important. Late hemorrhages due to constitutional trouble (usually hemorrhagic disease) after separation are commonly fatal if local measures do not stop the oozing. A hare-lip and figure of eight ligature are employed. Internally calcium lactate, adrenalin and gelatin may be administered. Immediately after tying the cord with three-sixteenths-inch cotton tape one-half inch from the skin, a dry sterile gauze dressing is applied and left in place for five days. If, when inspected, the cord is still moist the new sterile dressing is wrung out in 50 per cent. alcohol. The cord is not touched, but handled with spuds (toothpicks wrapped with cotton). If there is excessive granulation a sterile silver stick is used. No dusting powders are used if possible.—*American Journal of Surgery.*

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, April 21, 1908.

J. W. VanDerslice, M.D., President.

Dr. Frank W. Allin presented

A CASE OF MULTIPLE ABSCESSES DUE TO UMBILICAL INFECTION.

The mother of this child suffered from puerperal infection. The baby was in the same room. During the third week a red area was noticed below the navel, which spread rapidly downward, so that by the third day the lower part of the abdomen was red and swollen and there were similar areas on the thighs, legs and feet. Numerous abscesses followed, five of which opened spontaneously. No surgical intervention was allowed, and therefore no bacterial examination was possible. The muscles of the left thigh became shortened so that the left knee could not be extended.

Dr. Julia D. Merrill discussed this case.

Dr. J. G. Wolfe presented

A CASE OF TABES MESENTERICA.

A Jewish girl of ten years had lost in weight for a period of eighteen months, so that on admission to the hospital she was extremely emaciated, and complained of some abdominal tenderness, loss of appetite and weakness. Physical examination was negative, with the exception of distention of the abdomen, enlargement of liver and spleen, and the enlargement of all the superficial lymph nodes, the mesenteric being especially distinct. Two tuberculin diagnostic tests were negative. The child improved rapidly under diet and hypophosphites.

This case was discussed by Drs. Merrill, Rogers and VanDerslice.

Dr. Grace Campbell reported

A CASE OF ANGIONEUROTIC EDEMA.

The child in question, three years old, had a swelling the size of a tangerine over the left temple and upper part of the left cheek. This followed the eating of canned salmon. Under treatment the swelling rapidly disappeared.

This case was discussed by Drs. Hatfield, Merrill and Gill.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, May 12, 1908.

HERBERT B. CARPENTER, FIRST VICE-PRESIDENT.

EXTREME SCOLIOSIS RESTORED TO PERFECT SYMMETRY.

DR. WALTER G. ELMER showed a girl of eleven years who had had lateral curvature. When first seen the right costal margin rested on the brim of the pelvis and the trunk was carried far to the left side of the median line, her body looking hopelessly crippled. The diagram taken at that time showed an arc to the left, the maximum deviation being 2 inches. Rotation was not very marked. By the use of plaster casts and continued exercises, which Dr. Elmer had the patient demonstrate, her vertebral column, formerly dwarfed and twisted, had returned to its normal shape in just twelve months.

DR. JAMES K. YOUNG said that he had seen this girl at the beginning of the treatment and that the result achieved was excellent. He called attention to the fact that the personal equation was always a great factor in making records of such cases, as outlines taken by different individuals varied greatly. He considered the Theslow method of taking records an excellent way of recording the progress of the curve. This method, as originally designed, included the outline of the patient, standing, taken in a darkened room with a bright light. Dr. Young recommended special unilateral movements, followed by general movements, together with the use of supports. This combined method gave the best results in treating such cases as the one reported.

DR. J. T. RUGH said that the appearance of this case proved the beneficial effects of the treatment received. The complex nature of this deformity formed one of the greatest problems in its consideration and treatment, and each of the kind was a law unto itself and must be treated independently. It was difficult to get patients to devote the necessary time to the exercises prescribed. Dr. Rugh also mentioned the method of treatment by plaster of Paris, which utilized the inspiratory effort to alter the distortion of the ribs.

Dr. G. G. Davis also recommended the combined method of treatment for scoliosis.

Dr. Elmer said that the respiratory method, described by Dr. Rugh, would not have been applicable to this case. Here the rotation was only slight. He also described the oblique step taken by the patient, by means of which the psoas muscle pulls directly upon the vertebræ.

CONGENITAL LUXATION OF THE HIP.

Dr. G. G. Davis exhibited 10 children, varying from two to eleven years, all showing results of his operation for congenital dislocation of the hip. Upon some the operation had been performed recently; on others, several years ago. Some were still in plaster casts, and all showed good results.

Dr. Rugh said that these cases were extremely interesting. While Dr. Davis' method of reduction differed from that of Lorenz in the manner of accomplishing hyperabduction and hyperextension, yet the ultimate effects were practically the same, as the same force was required in either method to stretch the shortened and contracted structures and replace the head of the femur. The results in all cases depend upon the anatomic conditions in the affected hip, and when relapse occurred a second reposition will frequently prove curative. The general results were 60 per cent. of anatomic and functional cures. About 85 per cent. of the remainder were improved through the transposition of the head to an antero- from a postero-superior position. Dr. Rugh successfully reduced the hip of a girl past twelve years of age, with a good functional result.

Dr. Davis described anterior transposition of the head of the femur in some of these cases. He said that he had devised his method to avoid some of the results of the Lorenz method—broken thighs, injured nerves, etc. Severe traumatism must follow from the force used to replace the hip. By Dr. Davis' method the worst accident resulting had been a superficial skin blister.

SYPHILIS EXTRAGENITALLY ACQUIRED IN EARLY CHILDHOOD.

Dr. F. C. Knowles read this paper. The various sources of infection and those occurring under five years of age were, with but a few exceptions, mentioned in some detail. Unusual cases of inoculation were described under the following headings: Parturition, circumcision, vaccination, breast-feeding, hand-feeding, fondling, household utensils, toilet articles, unsterilized surgical, dental and electrical appliances, careless and unclean methods of caring for wounds, removal of foreign bodies and miscellaneous sources. Statistics as to the frequency of extragenitally acquired syphilis were also given.

Dr. M. B. Hartzell, discussing the subject by invitation, said that the initial lesion may be insignificant, yet one should remember that extragenital lesions are not uncommon in children. The sources of such infection are innumerable. The greatest number of extragenital chancres are found on, or near, the lips. Next come those cases produced by vaccination, but since the abandonment of the use of arm to arm vaccination and the adoption of lymph, this form has grown much less frequent. Treatment should never be begun before the secondary eruption appears to make the diagnosis absolute.

PERTUSSIS TREATED WITH THE ABDOMINAL BINDER.

Dr. P. B. Cassidy reported in full 12 cases of pertussis, in all of which application of the abdominal binder was followed by marked improvement.

Dr. W. N. Bradley said that he had employed the abdominal binder in several cases of pertussis. In one very severe case, a boy with paroxysms severe enough to cause subconjunctival hemorrhage, the binder had an excellent effect. It not only diminished the attacks of vomiting, but also the number of paroxysms.

Dr. A. H. Davisson said that in some infants under a year old, where he had made a diagnosis of pertussis and treated them with the binder, the results were so gratifying that the diagnosis was open to doubt. Dr. Davisson considers the community's aspect toward whooping-cough shameful. That a disease so contagious, which causes so much prolonged suffering, with so great a mortality among all classes, should be under so little control was a serious reflection on our medical and social administrative abilities. Dr. Davisson thinks that the Philadelphia Pediatric Society should take the initiative in obtaining a hospital for the care of patients with pertussis and suitable legislation to prevent its unnecessary dissemination. Further, there was here a most fertile opportunity presented to philanthropy for the investigation and amelioration of a disease which has as much claim for scientific and humanitarian consideration as have tuberculosis and diphtheria; with as likely prospects of equally brilliant results.

Dr. L. M. Allen cited an epidemic of pertussis affecting several families of children at a summer resort.

Dr. C. J. Hoban had treated some severe cases of whooping-cough, in which the abdominal binder did no good at all.

Dr. Herbert B. Carpenter has seen great improvement follow the use of a binder properly made and properly applied.

Dr. Cassidy explained that stockinette was used, set in as two side strips in Canton flannel, the binder then being laced up the back. In some of his cases drugs had also been given.

REPORT OF A CASE OF IMPERFORATE ANUS.

Dr. E. B. Hodge reported this case. (See page 678.)

Dr. A. P. C. Ashhurst said that two years ago he had operated at the Children's Hospital for Dr. Hutchinson on a child a day old for imperforate anus. He had had a general idea that it was proper to make an incision in the perineum, but that in case the bowel was not easily reached, that it was next proper to do iliac colotomy. In this patient he had reached the rectum at a depth of an inch and a half, and the baby made an interrupted recovery. Dr. Ashhurst had then determined to study the results of these operations, and had collected the series of cases to which Dr. Hodge referred. In only 3 out of 22 cases would it have been absolutely impossible to find the bowel through the perineum had a sufficient search been made for it. He had been a good deal criticised for urging the perineal operation so strongly; and he had no doubt that if he had seen the operations he might have agreed with the operators that a further search in the perineum would have been inexpedient. But when an incision had been made in the perineum only one inch deep, and when the autopsy showed that an incision a half, or even an inch, further would have reached the bowel, he thought he was justified in concluding that a more persistent search from below should have been made.

He had operated this winter, at the Episcopal Hospital, for Dr. G. G. Davis, on a child fourteen days old, with imperforate rectum. When brought to the hospital, it was constantly vomiting and crying in great pain. Its abdomen was alarmingly distended, very red, shiny and covered with large black veins. It looked as if any attempt at palpation would cause it to burst. Even flexing the thighs on the abdomen, to expose the perineum, seemed dangerous. Nevertheless, perineal proctoplasty was done, the bowel being found at about one inch and a half. Fecal matter was discharged under great tension, and the bowels continued discharging for the next twelve hours almost continuously. Recovery was uneventful, there being no vomiting and no evidence of discomfort after the operation. Although, on account of the baby's age and the extreme abdominal distention, Dr. Ashhurst had been tempted to do colotomy in this case, he was satisfied that the perineal operation was better, as there would have been no danger of protrusion of the intestines even if the peritoneum had been opened; and he could not see that it would be any more dangerous to open the peritoneum through the pelvis, as advocated by Stromeyer, than to open it through the abdominal wall. In Dr. Ashhurst's second patient care was taken to measure the distance from the skin in the anal region to the promontory of the sacrum. It was only one and a half inches, showing that the dissection had been carried up to that level without great difficulty.

Dr. Davis referred to a case in which, after he had successfully made an anus, he noticed a slight deformity, an excrescence on one thumb. This he tied off with a strong silk ligature. The child died, later, from hemorrhage from this ligature.

Dr. Hodge said that the personal equation is an important factor, particularly as each operator's experience must necessarily be limited. From his study of the cases reported, he would not feel justified in resorting to colotomy in another case until after a prolonged and careful dissection by the perineum, including a resection of the coccyx and lower sacrum if needed. Since preparing his paper he has learned of three reported cases besides those mentioned to-night by Drs. Davis and Ashhurst. In all of these the rectum was reached by the lower route.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. L. C. AGER.	DR. ALFRED F. HESS.
DR. E. C. FLEISCHNER.	DR. M. NICOLL, JR.
DR. HENRY HEIMAN.	DR. G. R. PISEK.

DR. S. W. THURBER.

PATHOLOGY.

PETIT, GEORGES, AND MINET, J.: A CASE OF GENITAL SYPHILIS. (*L'Echo Medicale du Nord.*, June 2, 1907, p. 255.)

The patient, an infant of five months, was brought to the hospital with edema of the lower extremities, fissured lips, ulcerations about the nares and bloody nasal discharge. The liver was enormously increased in size, the spleen palpable. The child lived but a short time. The autopsy showed well-marked hypertrophic cirrhosis of the liver with fatty degeneration of the parenchyma. The blood, taken just before death from a puncture of the finger tip, showed the changes due to the so-called syphilitic-pseudoleukemia of Van Jacksck, and also the spirochetæ pallida in small numbers. The blood taken from the heart at autopsy showed the latter in large numbers.

In an almost identical case, in a child of eighteen months, reported to the writer, the spirochetæ were found in the blood from the puncture of a superficial vein. M. NICOLL, JR.

MÉRY: DIABETES MELLITUS IN INFANTS AND CHILDREN. (*La Pathologie Infantile*, June 15, 1907, p. 124.)

The disease is comparatively rare. Pawy found 8 cases under thirteen years of age among 1,300 diabetics. Seegan 4 under ten years of age in 800. Leroux, in a series of 147 cases, occurring in childhood, found 4 under one year, 23 from one to five years, 43 from five to ten years and 77 from ten to fifteen years.

Heredity plays an important part in the occurrence of this disease: thus, in certain families, it has occurred in from 3 to 8 children in succession, whose parents have been similarly affected. Among the causes of the disease may be noted: traumatism, blows on the head, exposure to cold, lesions of the fourth ventricle, but most frequently an antecedent acute infection.

The pancreas is not always involved; occasionally there is hypertrophy of the liver or a lipemia.

The symptoms of the disease are identical with those of adults;

the treatment is similar. Complete cures only take place in those cases which are due to syphilis and are treated for that disease.

M. NICOLL, JR.

WENTWORTH, A. H.: THE CAUSE OF INFANTILE ATROPHY. (*Journal of American Medical Association,* July 20, 1907, p. 204.)

"The etiology of infantile atrophy has long been one of the mooted questions in pediatrics," says Wentworth. The fact that atrophic infants when put on a suitable diet mend at once is hard to reconcile with the presence of any severe anatomic lesion involving the greater part of the intestines. The fact that they do often mend so suddenly points to a functional rather than an anatomic disturbance. Investigations were made by the writer as to the functions of the intestines in normal and atrophic infants, based on the hypothesis of a defective correlation of the several digestive organs. The observations were made on a series of cats. The study of the summary shows that the material obtained from the stomach of atrophic infants possessed little or no power to stimulate the flow of the cat's pancreatic juice, indicating either a marked diminution in the strength or quantity of the secretion present; whereas, the secretion from the intestines of well nourished infants and children invariably produced activation of the cat's pancreas.

Wentworth formulates the following hypothesis as the result of his research: The digestive functions of the very young infant are not activated, because he does not receive the only food capable of adequately activating them, viz., human milk. This leads to an inadequate amount of gastric juice, which in turn does not stimulate the duodenum to form normal secretion. This defective secretion insufficiently stimulates the pancreatic secretion, and leads probably to unstudied disturbances in the lower gut.

G. R. PISEK.

WILLSON, ROBERT N.: RUPTURE OF AN AORTIC ANEURISM IN A CHILD OF FOUR YEARS. (*The Journal of the American Medical Association,* July 6, 1907, p. 15.)

Willson and Marcy report a case of rupture of an aortic aneurism in a child of four years, with autopsy.

The authors believe that the incipient aneurism was of intrauterine origin, probably due to parental syphilis. The aorta showed sclerotic changes, the radial arteries were thickened and there was general glandular enlargement. The instance is a rare condition, but is of practical interest in its bearing on the diagnosis of intrathoracic conditions in very young children.

G. R. PISEK.

MEDICINE.

WALLIS, C. EDWARD: THE "NOTCHING" OF LOWER PERMANENT INCISORS IN CONGENITAL SYPHILIS. (*The British Journal of Children's Diseases,* March, 1908, p. 88.)

Wallis reports and gives a photograph of a case with notched lower incisors. Typical Hutchinsonian teeth were present in the upper incisors. The pathology is given as exactly the same as in the upper teeth, namely, an incomplete development of the sides of the crowns and an imperfect development of the central tubercle. Wallis believes that this "notching" of the lower incisors occurs fairly frequently, but, owing to its non-mention in text-books, little or no attention is given to the condition or shape of these teeth. G. R. PISEK.

GUTHRIE, LEONARD: SYPHILITIC NEPHRITIS. (*The British Journal of Children's Diseases,* March, 1908, p. 90.)

Guthrie says he does not doubt that in some instances interstitial nephritis in infancy and childhood is due to congenital syphilis, but he does not believe that a case should be so regarded unless other manifestations of hereditary syphilis or a history of them are present. His practical suggestion is, that mercury is a dangerous drug to use in cases of nephritis. G. R. PISEK.

VON REUSS, A.: THE ELIMINATION OF SUGAR IN INFANCY. (*Mitteilung. der Ges. für Inn. Med. und Kinderhk. in Wien,* February 6, 1908.)

The elimination of sugar in the urine of infants must be considered under three heads. First, lactosuria, which usually depends upon some disturbance in the gastrointestinal tract; second, galactosuria, which is probably connected with functional changes in the liver; and, third, glycosuria, which is nearly always a result of some general metabolic change, as diabetes. The presence of melituria, sugar in the urine, of gastrointestinal cases is frequently observed. It is not very abundant, only in the severest cases reaching 1 per cent. Finkelstein considers lactosuria one of the most important symptoms of the condition that he describes as alimentary intoxication, and he believes that the lactose is the noxious substance bringing about this symptom-complex.

Bauer found in a very large number of patients suffering with cirrhosis of the liver, galactose in the urine. The rarity of this condition in infancy naturally determines the rarity of this symptom, but the author reports a case of an eight months old child with progressive emaciation, enlarged liver and spleen, in whose urine galactose was present, and who at autopsy showed the typical changes of liver cirrhosis.

Glycosuria is the most infrequent form of melituria in infancy on account of very great rarity of diabetes and kindred conditions. It has been found in a few cases of marasmus, which has lead Von Noorden to suggest that some so-called cases of marasmus with glycosuria are in reality diabetes.

E. C. FLEISCHNER.

DUNN, CHAS. HUNTER: RECENT ADVANCE IN THE KNOWLEDGE OF TUBERCULOSIS IN EARLY LIFE. (*Boston Medical and Surgical Journal,* September 19, 1907, p. 389.)

Tuberculosis is very common in children. The frequency of its occurrence increases rapidly month by month during the first two years of life. The influence of tuberculosis in infant mortality, however, decreases with advancing age.

During infancy and early childhood it is chiefly a disease of the lymph nodes. The bacilli do not multiply rapidly and rarely do they spread beyond the lymph nodes. The spread of the disease may occur in two ways—by general dissemination, producing an acute miliary tuberculosis (the most common method in infancy), or by metastases into various tissues, such as those of the bones, liver or brain. One tubercle bacillus is capable of producing a generalized tuberculosis by becoming lodged in a lymph space. General miliary tuberculosis is due to the dislodgement of a tubercular vascular thrombus.

Four chief theories have been advanced in explanation of the mode of dissemination of tuberculosis, namely: (1) by congenital infection, (2) inhalation of dried particles of sputum, (3) inhalation of fine moist drops, (4) ingestion of milk of tuberculous animals. There are probably several sources of infection, the most common being from the immediate surroundings.

The most frequent portals of entry are probably the lungs, tonsils, nasopharynx and intestines.

Theobald Smith has recently advanced a new theory in regard to the parasitism of the tubercle bacillus. He thinks that as an essential condition for its continued existence, the tubercle bacillus must have an exit from the body as well as an entry. He believes that this bacillus possesses a protecting envelope, which is removed by the action of the body fluids. It is not until this envelope is dissolved that multiplication can take place. The multiplication of the bacillus stimulates the body cells, which in turn check the growth of the bacillus. Some are then destroyed, while others, being protected by the process of caseation, acquire a new envelope and remain latent.

It has been attempted to produce artificial immunity by three methods: (1) Mithridatisation, producing active immunity by the frequent introduction of increasing doses of toxin. (2) Jennerisation, *i.e.*, infecting with weakened cultures of the germ. (3) Serum therapy, *i.e.*, passive immunity with immune serum. The last is of no value in tuberculosis.

While Wright's theory is very ingenious, it is not necessarily true, for the rise in the opsonic index does not necessarily mean an increase in immune bodies. The chief difficulty in producing immunity in tuberculosis is that the immunizing body is very toxic in nature. HENRY HEIMAN.

HUBBARD, THOMAS: PRIMARY NASAL DIPHTHERIA. (*Annals of Otology, Rhinology and Laryngology,* March, 1908, p. 172.)

Fibrinous or membranous rhinitis should be called nasal diphtheria, whether it is primary or not. It differs from faucial diphtheria in being nearly always subacute or chronic and manifests but slight toxicity. Nasal diphtheria, secondary to the faucial type, differs from the primary nasal infection in being a very active toxic invasion, with all the acute symptoms of such.

The author mentions two types of primary nasal diphtheria; in the one, there is a formation of false membrane with the attendant mucopurulent discharge; and in the other, there is the mucous membrane inflammation with mucopurulent or watery discharge and no membrane. Blood may give a red tint to the secretions. The disease, in its mild character, runs a course of several weeks, and there is a tendency to a recurrence. Extension to the fauces is rare. It may be limited to but one naris. Cultures frequently show pure Klebs-Löffler bacilli and clinical experience does not demonstrate them to be very virulent; yet nasal diphtheria may be transmitted to others and result in active faucial infection. The fact that the patient with the nasal type is up and about and the disease often unsuspected, renders him a danger to his associates. Primary nasal diphtheria is much more common in infants than is supposed. It is perhaps the common source of epidemics in institutions. Small doses of antitoxin have a marked effect in this type of the disease; however, the bacilli are harbored for a long time. S. W. THURBER.

ESCHERICH, TH.: ECZEMA SEBORRHEICA AND FAT DIARRHEA. (*Mitteilung. der Ges. für Inn. Med. und Kinderhk. in Wien,* January 16, 1908.)

A three months old child, with a very diffuse seborrheic eczema and a fat diarrhea, was treated with buttermilk, and the cutaneous lesions disappeared in a few days. The child had been nursed from birth, at first by its mother, later by a wet nurse, and from the beginning had had thin, watery stools, containing fat fragments. It had gradually developed an oily seborrheic eruption all over the body. Fatty applications applied to the skin aggravated the condition. Even after the eruption had entirely disappeared vaselin and fatty ointments were borne very badly by the skin. The occurrence of the marked fat diarrhea coming on so soon after birth, without any pathological basis, leads one to the conclusion that the case was one of congenital fat intolerance, and that the normal fat secretion of the skin produced of itself an inflammatory reaction. Escherich emphasizes the importance of fat-free diet in the seborrheic cases.

E. C. FLEISCHNER.

LONGO, H.: PARALYSIS IN CHILDHOOD, DUE TO GASTROINTESTINAL INTOXICATION. (*La Pédiatrie Pratique,* January, 1908, p. 19.)

Notwithstanding the fact that the diagnosis of intestinal intoxication is so frequently used to mask ignorance in obscure cases, and the views of Concetti, who primarily ascribed certain disturbances of the nervous system to intestinal toxemia, have been condemned by many authors, nevertheless, it must be conceded that certain cases of paralysis in infancy and childhood have as their etiological agent a toxic condition of the gastrointestinal tract.

The following case is a very interesting example of this class. The child, age four years and eight months, with an absolutely negative family history, had been nursed up to seven months. After that, mixed feeding was employed. At nine months she had an attack of enterocolitis, which was cured in ten days. At thirteen months, while apparently in perfect health, the baby suddenly fell to the ground as if suffering from severe vertigo. When picked up, it was found she could not stand. She was apathetic, and had considerable fever. There was no vomiting or convulsion. Following free catharsis, the fever and apathy disappeared. There persisted, however, a paralysis of the left side. Five months later all trace of this was gone. From two years on the patient had a chronic gastrointestinal disturbance. She was very much constipated, and every twenty to thirty days would have attacks of diarrhea, with slight fever and very foul stools. These always yielded to catharsis and dietetic treatment. This condition of the intestinal tract persisted for two years, when suddenly, while playing, the child again fell to the ground. She was somnolent when picked up, and had convulsive movements of the whole body. She had very bad and offensive movements of the bowels. In a few days the fever and somnolence disappeared, but there persisted a right hemiplegia and aphasia. An examination four months after the onset of this attack was absolutely negative.

It is evident, from the history, that the gastrointestinal tract and the nervous system were involved, but to trace the connection between the two systems it is necessary to exclude the various organic conditions of the brain, which might give such a clinical picture. The author excludes the more marked organic lesions by the total absence of symptoms and physical signs four months after the onset of the paralysis. His diagnosis, "paralysis due to gastrointestinal toxemia," is based upon the views of Concetti, who ascribes such symptoms to microscopical changes in the nerve cells, such as tumefaction of the chromatophilic granules, lesions produced by the absorption of the intestinal toxins.

E. C. FLEISCHNER.

BLAKE, J. EDDY: CARDIAC DILATATION FOLLOWING ACUTE INFECTIOUS DISEASES. (*New York State Journal of Medicine,* November, 1907, p. 438.)

The author urges that the heart be carefully watched in all cases of infectious diseases and appropriate measures taken to reduce its work to a minimum, to prevent strain and to eliminate toxins before heart failure threatens.

He believes that in all toxemias the heart is more or less affected. The symptoms may develop at any time, but most commonly in convalescence. The first evidences of cardiac involvement are changes in the first sound heard at the apex and diminished tension in the arteries. If the loss of cardiac tone is sufficiently great, dilatation follows. This is characterized by irritability, weakness and irregularity of the pulse. A dilatation out to one finger's breadth beyond the nipple line is usually recovered from, two fingers' breadth is dangerous, and three usually fatal. G. R. PISEK.

CALMETTE, A., BRETON, M., PETIT, G., PETIT, L., MASSOL, L., MINET, J., AND FORNARIO, G.: ON THE ABSORBING POWER OF THE LARGE INTESTINE. (*L'Echo Médical du Nord.,* February 9, 1908, p. 61.)

Tuberculin.—One cgm. of an alcoholic precipitate absorbed by the rectum produces the same effect in a tuberculous subject as when injected subcutaneously.

A positive opthalmic reaction may be reproduced by this means. In tuberculous rabbits and guinea pigs, rectal administration produces the same effect as the subcutaneous, but when these same animals are healthy a single large dose or small doses repeated produces a slowly progressing toxemia, which generally ends fatally without establishing immunity. It is believed that this method of using tuberculin may often be advantageous, as, for instance, when it is desirable to keep the patient in ignorance.

Tetanotoxin and Antitoxin.—From experiments on guinea pigs it was ascertained that tetanotoxin is modified, or destroyed, in large part by the bacteria of the large intestine, and only a small quantity passes into the system, but that the corresponding antitoxin is more readily absorbed and may be thus used with good effect.

In the case of cobra poisoning, directly contrary results were obtained, the antitoxin being less readily absorbed than the toxin.

Albumins.—These are readily absorbed by the rectum, and this method may be utilized to obtain antibodies or sera-precipitating absorbable albuminoid substances.

Plague.—Inoculation against this disease was experimentally successful when the cultures administered by the rectum were first warmed to 60° for sixty minutes. M. NICOLL, JR.

SURGERY.

LEALE, MEDWIN: SOME CONSIDERATIONS IN THE MANAGEMENT OF BURNS AND SCALDS IN INFANTS AND CHILDREN. (*Medical Record*, May 9, 1908, p. 770.)

The treatment advocated by Leale emphasizes the importance of only sterile dressings and applications coming into contact with the burns. All foreign substances are to be removed and serum accumulations drained. Irrigations with warm saline solutions, or a 3 per cent. solution of boric acid, are recommended. For protection of wound surface he applies an ointment made of sterile zinc oxid power and sterilized olive oil. Rubber tissue or silver foil slips covered with gauze are applied if the papillary layer is involved. The loss of body heat must be guarded against by every means at command. Ulceration is more apt to occur in tuberculous or syphilitic children. Constitutional treatment is of great importance. The body heat, pain, shock, emunctories and the diet must all receive careful attention. G. R. PISEK.

KOPETSKY, S. J.: THE SUPPURATIVE MIDDLE EAR DISEASES OF INFANCY AND CHILDHOOD. (*Annals of Otology, Rhinology and Laryngology*, September, 1907, p. 589.)

The ear of the child being in the developmental stage, makes it a ready field for disease. The examination of about 23,000 school children in Zurich showed that 14 per cent. were, or had been, affected with suppurative otitis, and this in those under four years old. About 70 per cent. of all children applying for hospital treatment at an ear clinic showed the same condition, and perhaps one-third of the cases of chronic deafness in adults can be traced to the same cause.

The author classifies the underlying factors as follows: (1) General constitutional diseases and the hereditary influence of syphilis and tuberculosis. (2) The exanthemata of childhood. (3) The anatomic peculiarities of the infant ear.

The clinical picture of tonsillar and adenoid enlargement may be due either to syphilitic or tubercular hyperplasia, and the ear suppuration may be part of the same process rather than the result of enlarged tonsils and adenoids. Removing these hypertrophied glands under these conditions would not affect the ear condition. On the other hand, when the adenoid is diseased *per se* and causes nasal obstruction, then it becomes a menance to the health of the ear. As Mackenzie has truly said, the discovery of the adenoid has probably saved 100,000 individuals from deafness.

The usual route of infection is through the Eustachian tube, which, in the child, is comparatively short, open and horizontal. A direct effect of the ear infection by the streptococcus or pneumococcus is often seen in the gastrointestinal disturbances, and there is undoubtedly a close connection between these two tracts. The localization of pain in the infant is not good, but fever, restlessness, rolling of the head, refusing food without any apparent cause, makes it imperative to examine the ears. In older children the local symptoms may be better guides.

As to treatment, the use of leeches is condemned, and the painting of tincture of iodin behind the ear substituted. The application of heat and cold is unsatisfactory in infants. Pharynx must be kept clean, and both intranasal and pharyngeal obstructions minimized or removed. An early paracentesis is advisable; it is better to open the drum too early rather than too late. The operations for mastoid involvement are then discussed.

S. W. THURBER.

MORSE, JOHN LOVETT: ADENOIDS IN INFANCY. (*The Journal of the American Medical Association,* November 9, 1907, p. 1,589.)

The importance of adenoids in early infancy, Morse believes, is not sufficiently appreciated by the profession. He affirms that they do not recur in the majority of instances; that the operation is without danger; saves the patient a multitude of ills caused by their presence, and even if they recur they can again be easily removed. He proves his statements by referring to the anatomy of the parts. Adenoids in infancy interfere with sucking, and thus impair nutrition, as shown by his reported case. Colds and snuffles, laryngitis and spasmodic croup are attributable to adenoids. Bacterial invasion and tuberculous infection is made more possible by the presence of adenoids. Otitis media, in his experience, especially repeated attacks, is invariably due to adenoids. G. R. PISEK.

HYGIENE AND THERAPEUTICS.

KNOPF, H. E.: THE PROPHYLAXIS OF STUTTERING. (*Der Kinderarzt,* No. 2, 1908, p. 25.)

The author believes, with Kussmaul, that stuttering is a coordination neurosis. The method advocated for a cure is to show the stutterer consciously or unconsciously, according to his mental development, what movements of breathing, voice modulation and articulation are normal. Much depends on the energy of the patient and that of his physician or teacher. Hypnotic suggestion is not advocated, as it gives only temporary results.

The prophylactic measures are: Combating the neuropathic disposition, the influence of hypochondriacal or hysterical parents, and separating the child from the environment of stuttering people. Any abnormalities in the respiratory tract and teeth must first be removed. He advocates that stuttering and choreic children be placed in special schools, and that teachers and mothers receive instruction along the lines advocated above.

G. R. PISEK.

GREEFF, R.: THE PROPHYLAXIS AND TREATMENT OF OPHTHALMIA NEONATORUM. (*Die Therapie der Gegenwart,* January, 1908, p. 27.)

Crede's method is duly honored by the writer, but he believes that the solutions are unnecessarily strong—1 to 5 per cent. That they sometimes cause ulceration, and that the suffering caused is unwarrantably prolonged. His further reasons against the method are a stubborn turbidity of the cornea, which occurred at times, and the fact that the stronger solutions did not penetrate as perfectly as the weaker ones. A solution of 1 to 1,400 of silver nitrate is sufficient to kill the gonococci quickly. Therefore, it is recommended that a ¼ per cent. solution be used in infected cases, and a 0.1 per cent. for prophylactic purposes.

It should be recollected that a number of children are not infected at birth, but by unclean handling afterwards.

G. R. PISEK.

RAVAUT AND DARRE: A STUDY OF MENINGEAL REACTIONS IN A CASE OF HEREDITARY SYPHILIS. (*Gazette des Hopitaux.*, February 12, 1907, p. 207.)

The writers give a brief bibliography of the subject and report an interesting history of a case observed from birth until an apparent cure at the age of three years. The mother was syphilitic and the child had mucous patches, etc., at three weeks. Inunctions were begun at once. She did well for three months and then began to lose weight and developed opisthotonos, retracted abdomen, Kernig's sign, slight convulsions. Physical examination was in all other respects negative, temperature subnormal. Ten c.c. of spinal fluid were withdrawn—under greatly increased tension. There was some improvement, and three days later another 10 c.c. were withdrawn, followed by great improvement. This fluid showed 30 lymphocytes to the 1-12th immersion field. During six months ten lumbar punctures were made on account of five attacks of meningeal irritation. They showed a progressive decrease of the lymphocytosis and the crises became less severe. From that time on the child developed normally, and during the next three years five spinal punctures were made, each yielding normal fluid.

The writers claim two great uses for this repeated spinal puncture: first, marked relief of the acute symptoms; second, a positive guide for the mercurial treatment in the progressive decrease in the spinal lymphocytosis. L. C. AGER.

FORD, WILLIAM: ANTIBODIES TO GLUCOSIDES, WITH ESPECIAL REFERENCE TO RHUS TOXICODENDRON. (*Journal of Infectious Diseases,* November 15, 1907, p. 541.)

The observation that numerous attacks of poisoning by the Rhus toxicodendron confer some degree of immunity suggested experimentation with this glucosidal poison. It was found that both rabbits and guinea pigs could be killed by subcutaneous inoculation of a definite quantity of this toxin, but that they were able to withstand far greater quantities if they were subjected to gradually increasing doses. In other words, a relative immunity could be artificially acquired. Further experimentation showed that the serum of these inoculated rabbits was able to protect other rabbits which had been subjected to an inoculation of even more than a fatal dose of the toxin. The author concludes with the suggestion that possibly a serum of this nature might be employed in severe cases of poisoning by Rhus toxicodendron and obtain a definite place in practical therapy.

ALFRED F. HESS.

FORDYCE, A. DINGWALL: DIGESTION AND FEEDING IN INFANTS. (*Scottish Medical and Surgical Journal,* August, 1907, to January, 1908.)

The writer covers the various problems connected with the subject in a very concise and thorough manner. The contrast between English and Continental methods of feeding and those practiced in America is well brought out. It may be said, however, that a number of the recommendations of the writer, as well as his conclusions, in regard to the treatment of milk and its modifications, would not be accepted by American authorities on this subject.

Among the points noted may be mentioned the following: That one should regard the limit of milk dilution with water continued for any length of time as one to two; that there is no reliable evidence that milk pasteurized, scalded or boiled can produce rickets if the milk is originally of good composition, is undiluted, and given at suitable intervals and in suitable amounts. As regards scurvy, there seems to be a doubt in the author's mind whether prolonged boiling may not be a cause of it.

Citrated milk is placed in about the same category as peptonized milk: useful as a temporary food, in certain cases of difficult proteid digestion, but not to be kept up indefinitely.

The more simple examination of the stools is recommended as of importance in arriving at the probable cause of digestive disturbances. On the other hand, the examination of the stomach contents has given a bewildering variety of conclusions among different experimenters, possibly due to lack of uniformity in methods employed.

The author believes that scalded milk, modified according to age and digestive capacity, is the proper food for infants.

M. NICOLL, JR.

HAND, ALFRED, JR.: THE DISADVANTAGES OF LOW PROTEIDS IN INFANT FEEDING. (*The Journal of the American Medical Association,* November 16, 1907, p. 1,654.)

By "low proteids" Hand means any percentage below half of that present in cow's milk. Certain disadvantages, he believes, result in "difficult feeding cases," which are kept on low proteids because they *seem* unable to handle normal percentages. A vicious circle is established, detrimental to the development of the child; constipation, irregular gain in weight, fretfulness, rickets, curdy stools, anemia, liability to enteritis, susceptibility to infections and sometimes infantile atrophy result from low proteids.

These cases are usually handled in two ways—by "underfeeding" or by "sthenic feeding." The author prefers, where possible, to use the latter, *i.e.,* feedings containing proteids which a normal infant of the corresponding age takes. He uses certified milk diluted with cereal decoctions; occasionally pepsin or pancreatin are given for a few weeks. He has often seen excellent results follow this method, when he thought the infant's digestion below par. G. R. PISEK.

DARLINGTON, THOMAS: WHAT HEALTH DEPARTMENTS CAN DO TO SECURE PURE MILK BY INSPECTION OF DAIRIES AND FARMS. (*American Medicine,* November, 1907, p. 629.)

WENDE, ERNEST: WHAT HEALTH DEPARTMENTS CAN DO TO SECURE PURE MILK BY THE PERMIT AND LICENSE SYSTEM. (*American Medicine,* November, 1907, p. 643.)

These two articles, presented by the Health Commissioners of the cities of New York and Buffalo, at the conference of Sanitary Officers of the State of New York, show how much might be done to render safe the milk supply of large cities, and by implication suggest the practical difficulties to be overcome in making any changes in the old-fashioned methods of producing milk.

As a city grows the expense and difficulty of securing pure milk increases geometrically. New York requires 1,750,000 quarts of milk a day, which is gathered from over 35,000 farms, located in six states. This presents a much more complex problem than does the milk supply of Buffalo, which is produced in something less than 1,000 dairies comparatively near the city. Yet Dr. Wende speaks rather despairingly of what has thus far been done in the way of supervision.

Both writers agree that the desired results can only be accomplished by the careful supervision of everything and everybody connected with the milk supply, from the cow to the consumer, and that both the producer and the consumer are greatly lacking in a knowledge of the dangers of milk infection and the proper means of avoiding it. L. C. AGER.

KERLEY, CHARLES G.: TARDY MALNUTRITION: ITS TREATMENT BY DIET AND REST. (*Journal of American Medical Association,* November 9, 1907, p. 1,595.)

By tardy malnutrition Kerley refers to children who, after the age of two years, while free from such diseases as tuberculosis, syphilis and chronic nephritis, show marked developmental defects, in that they are under weight or are both undersized and under weight. They are children with a diminished resistance and suffer from secondary anemia and anorexia. An excessive output of energy and an absence of adequate rest produce loss of appetite, constipation, indigestion, the end result being malnutrition and anemia. Kerley advises common-sense diet, an absence of food and sweets between meals, with a rest after the noonday meal, and has proved the value of such advice by bi-monthly weighings and blood examinations.

G. R. PISEK.

ROSENAU, M. J., AND ANDERSON, JOHN F.: THE INFLUENCE OF ANTITOXIN UPON POSTDIPHTHERITIC PARALYSIS. (*Bulletin No. 38,* Hygiene Laboratory, United States Public Health and Marine-Hospital Service.)

This study was carried out upon guinea pigs, in which animal the paralysis is an almost exact counterpart of the same sequel in man. It was found that although antitoxin cannot influence an existing paralysis, nor prevent this complication if this treatment is resorted to shortly before the paralysis develops, it can greatly modify this sequelæ if employed within twenty-four hours of the date of infection. A very small quantity of antitoxin, one unit, was sufficient to prevent paralysis if given at the time of infection; whereas, 4,000 units were of no avail if injected forty-eight hours after infection.

The authors point out that in man better results may be anticipated, as in this experimental diphtheria we are dealing with a malignant form of the disease, and we are injecting the toxin in one dose directly into the tissues of the animal. In man, in whom the toxin is elaborated more slowly, more beneficial results as regards the prevention of paralysis would probably result.

ALFRED F. HESS.

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EPIDEMIC CEREBROSPINAL FEVER: ITS CLINICAL AND PATHOLOGICAL PHASES, WITH PHOTOGRAPHIC ILLUSTRATIONS.*

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Hirsch, in his handbook of *Geographical and Historical Pathology,* describes four cycles of epidemic meningitis in Europe and America during the nineteenth century. The first cycle began in Geneva, Switzerland, in 1805, spreading widely throughout Europe and subsiding there about the year 1830; and in the town of Medford, Mass., about March, in the year 1806; gradually extending in the United States throughout the Eastern, Middle and South Atlantic States, and to the Eastern States of the Mississippi Valley. This American cycle ended about 1828.

The second cycle this author describes as beginning with two simultaneous outbreaks in the south of France in 1837; one in Bayonne and Landes, the other in the districts of Foy and Marbonne. From these two centers the disease spread over the greater part of France in ten years' time, until the time it subsided, in the late forties. Scattered outbreaks were reported from many places in eastern and western Europe and in America during these years.

The third period he describes as beginning in Sweden in 1854, where the disease appeared for the first time in history, lasting for quite ten years; and at about the same time it appeared in parts of western Norway, a very malignant type of it being present in Optal (Hedmarken) in 1850. During this cycle a considerable epidemic was noted in Germany, between 1864 and 1865, the southern section of the country being most affected.

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* An address delivered before the North Western Medical Association of Philadelphia.

Austria, Hungary, Roumania and Ireland were seriously affected, while the United States, between 1857 and 1874, had a very serious epidemic; and for the first time the disease made its appearance in England in 1867. During the period the United States was passing through her great Civil War, an outbreak raged in the Confederate Army in the camp at Newbern, N. C. (1862 and 1863), and in the army of the Potomac when near Washington (1861 and 1862). Philadelphia, in 1863, had a severe epidemic, and more than one hundred patients were admitted to the Philadelphia Hospital alone. Alfred Stille wrote his memorable monograph from data based chiefly upon a study of the pathological findings of these cases in the Philadelphia Hospital.

The fourth cycle Hirsch describes as beginning in the year 1876, when a small epidemic was reported in Birmingham, England. Many cases occured in Dublin in 1885, 1886 and 1887. Outbreaks were also reported in Poland and the interior of Russia. France had an outbreak in 1890. Prussia, from 1879 to 1881, had several slight epidemics, and cases were reported from various parts of the United States. This cycle ended about 1890.

The disease has remained, sporadic, in all of America's large cities, particularly Boston, New York, Philadelphia and Chicago, since the third great cycle swept over this country.

The historian must soon add a fifth cycle, which began with localized outbreaks in the latter part of the nineties in various sections of the United States and in European countries, and which has continued until the present time. The serious part of this epidemic, however, did not begin here until the late winter and spring months of 1904-5, in New York City, and in Philadelphia at the same season of 1905, and in Germany, England and Scotland in 1906 and 1907, although many cases were reported from Ireland as early as 1903. The complete history of this cycle cannot yet be written. The disease is prevalent at the present time in various sections of the world, and when statistics have been compiled perhaps this present or fifth cycle will prove more serious than has any other in the history of this most distressing and hopeless disease. Certainly in this country, and especially in New York City, the epidemic reached alarming proportions. The number of deaths in New York City reported from this disease alone ran for a period of weeks, in 1904, at more than one hundred each week; 3,029 died in 1904 and 1,404 in 1905. Philadelphia has had reported to the bureau of health in recent years occasional cases, scattered throughout the city, during the latter part of each winter, and a small outbreak was reported at League Island in 1904. The first semblance of an outbreak in the city proper, however, could scarcely be said to have appeared before March of 1905.

The causative agent of this disease has been known now for a number of years. Weichselbaum described a diplococcus occurring both within and without the leukocytes in the spinal fluid in this disease as long ago as 1887, and reported the findings in 6 cases. The organism, because of its shape, grouping characteristics, and by being found so constantly within the cell, was named the *diplococcus intracellularis meningitidis.* The modern tendency is toward shortening this unwieldy term and referring to this organism as *micrococcus intracellularis,* or *meningococcus.*

Much speculation has been done as to the possible transmissibility of the meningococcus and its method of entry into the body. There are those who believe that the infection gains entrance to the human meninges by way of the nasal mucosa through the cribriform plate of the ethmoid; this view is frequently taught in Germany; others believe that the germs reach the blood stream through the upper respiratory tract and eventually find a nidus in the spinal fluid; still others allege a direct lymphatic route for transmission. The later theories are in effect that in some curious way the germs find lodgment within the nerve sheaths, and extension along these channels to the meninges of brain and cord takes place. All of these theories leave room for speculation and doubt in the minds of physicians as to the route of invasion.

That the disease is sometimes transmitted cannot longer be disputed. The careful bacteriological studies done, under the supervision of the New York Board of Health, along these lines seems to be convincing that the meningococcus may be carried and disseminated by the nasal mucosa. These workers very frequently found the meningococcus in the nasal cultures of exposed attendants, nurses and doctors, and they were even able to trace a meningococcus carrier from the bedside of a child ill with epidemic meningitis to her flat, to determine the time of her visit to children in an adjoining flat, and to observe there a period which might be said to represent a period of incubation between her visit and the time these children sickened with meningitis.

Nurses occasionally fall ill with this disease while exposed. In five instances patients have come to us at the hospital from houses where others had already sickened; and in two instances the attending nurses, one a young mother of thirty, the other a grandmother of sixty-nine, contracted the disease and sacrificed their lives. The very sad case of Dr. Craig is still fresh in the minds of all Philadelphians. I am sure you remember that in his case a period of three days elapsed after the death of his friend and patient before he himself sickened with the disease. We cannot, therefore, feel that those who care for meningitis—the doctor, the nurse, the attendant, and even the occasional visitor—are without danger of contracting the disease.

We, as yet, know too little about its method of transmission to outline preventative measures. In view, however, of the recent work of the Board of Health in New York already referred to, it looks as though the meningococcus frequently may be carried in the nasal mucosa. It would seem, then, to be reasonable observance for those who treat this disease, or who are employed as nurses or attendants upon persons sick with epidemic meningitis to irrigate carefully the nose and throat at frequent intervals. It seems wise also that care be taken to protect the hands and the personal clothing of those who come into contact with meningitis, lest infected material carrying meningococci be distributed widely; visitors also should observe the same precautions as the nurse and doctor. From a board of health standpoint it is wise that notification take place and that disinfection be practiced after the case is completed.

The pathological changes in this disease cannot be distinguished from other forms of purulent cerebrospinal meningitis by morbid appearances. When death occurs early there is marked injection of the blood vessels of the meninges of both brain and cord, and the spinal fluid is cloudy, semipurulent or purulent. The amount of fluid in the meninges and the ventricles may be excessive. Where the patient lives four or five days to a week, large quantities of fibrinopurulent material or butter-like exudate may be found along the spinal cord, over the pons and medulla, or over the cortical surface of the brain; and it may extend deeply into the fissures. The ventricles may contain excessive amounts of fluid, cloudy and purulent in character. From the pressure of great amounts of fluid softening of areas of brain and cord may be seen. (Figs. 1 and 2.)

Histological study will show the meningococcus both within and without the cells in the cloudy fluid, or in the purulent exudate, and the polymorphonuclear neutrophiles will largely outnumber the lymphocytes. Stained sections of the involved areas of the brain or cord will show the usual acute inflammatory changes of these organs found when due to other causes. A more extended study with microscopical examination of the nerve trunks leading from the spinal cord and from the brain will show that this inflammation has extended through the vertebral and cranial foramina along these trunks for considerable distances. This involvement of the cranial trunks gives us the eye and ear symptoms and sequelæ.

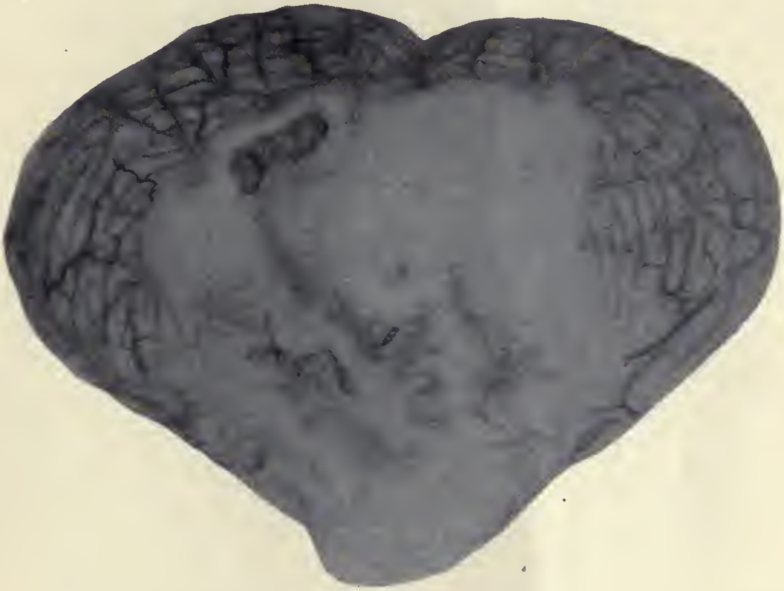


Fig. 1. Photograph of the base of the brain removed from a child eight days ill with epidemic meningitis, showing plastic fibrinopurulent material.

The blood changes are helpful to the diagnostician, but are not pathognomonic. A very high leukocytosis is almost constantly found early in the illness, and this high leukocyte count persists until the disease is well controlled or until death is near. We have had leukocyte counts as high as 47,000 per c.mm. The average white cell count is about 19,000 per c.mm. The distinctive white cell count is interesting, but does not differ materially from the other infectious processes. In a large series

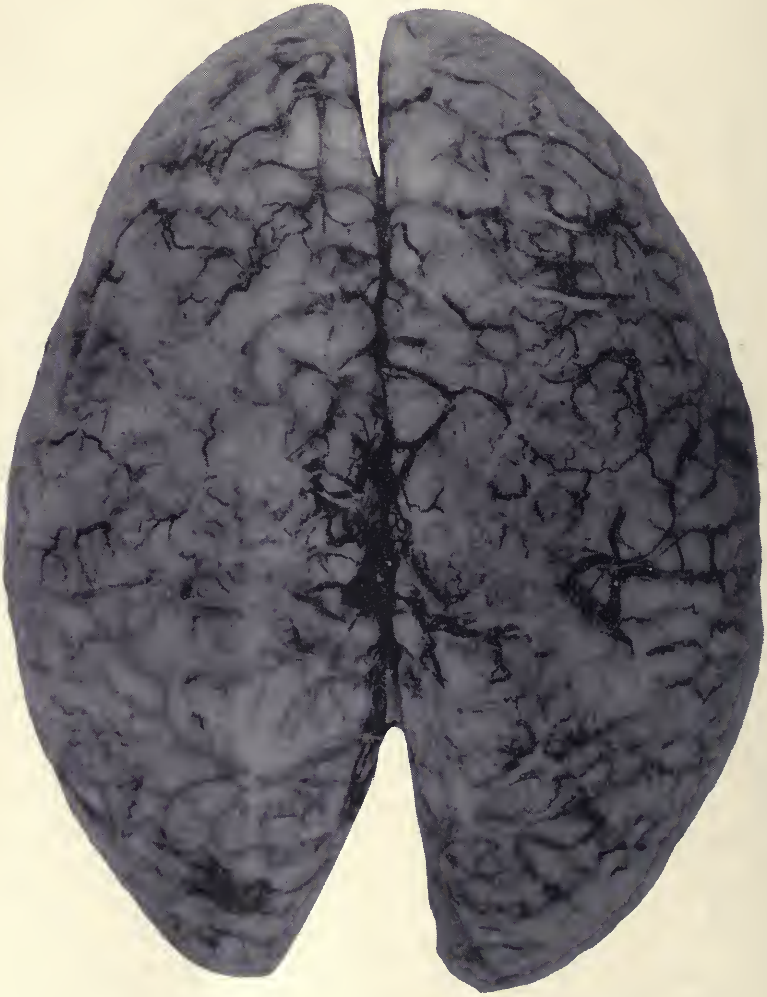


Fig. 2. Photograph of the superior surface of the brain of a child dying of epidemic meningitis on the sixteenth day of illness. Purulent material is seen in many areas on the pia.

of cases the average distinctive leukocyte count early in the illness was as follows: Polymorphonuclear neutrophiles, 82.5 per. cent.; large lymphocytes, 7.5 per cent.; small lymphocytes, 9.5 per cent.; eosinophiles were occasionally seen, and sometimes late in the disease, as the infection subsided myelocytes were found. As the disease progressed the percentage of polynuclear cells declined, while the small lymphocytes increased and eosinophiles became more common. The red cells show no material change in form or in number. Nothing of prognostic import is learned from the blood. Patients with high, and others with low, leukocyte counts died or were cured, and the same observation was made in the presence or absence of eosinophiles.

The onset of cerebrospinal fever is interesting and entirely characteristic. Headache is almost constant; pain in back and legs or in joints is nearly always found; vomiting, sometimes projectile in type, and chills or chilliness are usually met with; while delirium, sometimes violent in character, is almost constantly noted at some time in the early stages of the illness, and convulsions are very frequent at the onset in young children. Very early in the disease characteristic positions are noted; backward retraction of head, retraction of the back; petechial eruptions on the skin, herpes about the mouth, cheeks, eyes, or other parts of the body are seen; deafness on one or both sides, partial or complete, is frequently met with and certain changes in reflexes are almost certainly found if the clinician looks for them. (See Figures 3, 4 and 5.) Even in the early stages of the disease Kernig's sign will be found positive except in those fulminating cases so overwhelmed with the infection that complete relaxation takes place, and the patients are found to be profoundly unconscious. Sooner or later in the disease the patellar reflexes become exaggerated or disappear, the plantar reflex is often lost early, and the epigastric reflex is exaggerated or disappears. With excessive fluid in the ventricles Macewen's tympany may be elicited. Hyperesthesias are occasionally noted, and sometimes anesthesias are seen in various areas of the body.

A loss of eye reflex is frequently observed; paralyses of ocular muscles are often seen; photophobia and ptosis are frequently present; purulent conjunctivitis is common; and a symptom is met rather constantly in the eye, which is not mentioned in the American text-books, viz., corneal, bulbar and conjunctival anesthesia. In a very large percentage of our cases this symptom was noted. Its first observation in the Municipal Hospital was made in the most accidental way by Dr. E. Burvill-Holmes at the time first assistant resident physician. I had requested that search be made by him for meningococci in the purulent eye discharges of a patient ill with meningitis. While making a culture from this patient's eye with the usual sterile cotton swab used in diphtheria culture work the cotton slipped off the wire and lay in the cul de sac. No attempt was made on the part of the patient to dislodge the cotton. The patient was perfectly conscious; anesthesia was, of course, suspected. Dr. Holmes at once examined the eye more carefully and the patient's other eye at the same time, and found a true anesthesia present in both eyes; the cotton swab could be swept freely over cornea and conjunctivæ without resistance. Several other patients in the ward at the time showed the same lesion. For a time we believed that an undescribed symptom had been discovered; but within a week after this observation, which I am sure was entirely original with Dr. Holmes, was recorded, I ran across an article by Travers Smith, published in the *London Practitioner,* reporting a large series of cases of epidemic meningitis, and pointing out that this sign was very frequently met with in his cases. I do not know who made the original observation or who first described the symptom; but I am quite certain that not enough mention is made of it in medical literature in this country, and that the books ignore the sign entirely. I have not had an opportunity to examine the eyes of enough cases of tuberculous meningitis to state whether it would be of distinctive value in determining if a given case is tuberculous or epidemic in type. I hope further observations will be made along this line by those who have opportunity to treat numbers of cases of tuberculous meningitis.

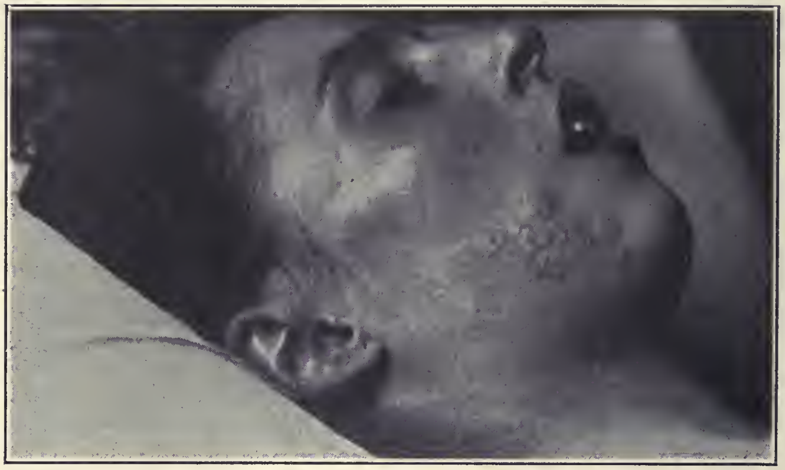
Another symptom of the epidemic type of meningitis, which I do not find in the American literature of this disease, was first pointed out with us by Dr. Ernest G. Maier, one of our resident staff. In testing for areas of anesthesia and hyperesthesia he found that he was much more apt to get marked muscle soreness than he was to get hyperesthesia of the skin. This was particularly true in the lumbar muscles, the erector spinæ muscles, the muscles of the thigh and occasionally in those of the upper arm and in the calves of the legs. The muscle soreness is so noticeable, and on light pressure causes so much evidence of pain that it may easily be mistaken for hyperesthesia of the skin. Unless the skin test is made with great care, and with this symptom in mind, I am certain that in many instances hyperesthesia will be reported where soreness of the muscles is the cause of the pain elicited.

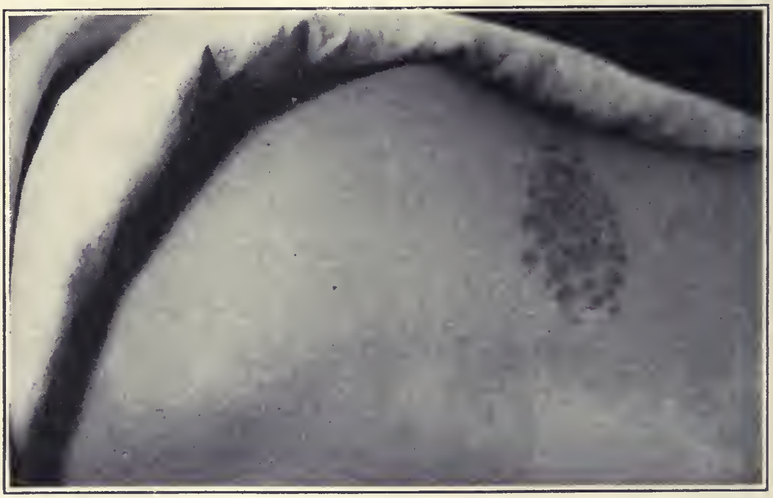
The fever early in the illness is high in most cases; the temperature may go as high as 106° F., but is more usually found to approach 102° to 104° F., and to become very irregular in type. (See chart, Fig. 8.)

The diagnosis of epidemic meningitis should always be made when any considerable number of these symptoms are present; for this illness is so rapid in onset that a child well and strong today may tomorrow be prostrated, violently delirious, vomiting, suffering intense pain, excruciating headaches, having with these symptoms possibly exaggerated reflexes, positive Kernig's sign, or anesthesia of the cornea. So, too, epidemic meningitis should be suspected in those cases of sudden onset with profound unconsciousness from overwhelming infection, where a patient may be found relaxed, flabby and alone in his room perhaps, twenty-four to thirty-six hours after the onset. It not uncommonly happens that a child well and happy at midday is profoundly ill with all the characteristic symptoms of epidemic cerebrospinal fever at midnight or on awakening in the morning.

Exceptions, however, are to be noted with this disease as with all other diseases. It may happen that the illness is mild in character and presents but one or two symptoms that may lead you to suspect the meningitis. I recall very well a child seen in consultation with Dr. Carl Früh, in whom the onset with headache and torticollis was sudden and in which the eye symptoms and other nervous manifestations were entirely absent, and not until microscopical study of the spinal fluid was made were we able to determine positively the diagnosis.

To distinguish this disease from other forms of acute meningitis, particularly the forms which are characterized by rapid onset, such as pneumococcus and streptococcus infections, and meningitis in the course of fevers, or meningitis following suppurative processes, it is absolutely necessary to do a lumbar puncture and study the fluid withdrawn from the spinal canal. In the absence of the characteristic organism a diagnosis can be made between tuberculous and an acute form of meningitis by a distinctive cell count. In the acute infectious process the cells found in the cloudy fluid are nearly all polymorphonuclear in type and are numerous, while in a chronic process like tuberculosis of the meninges the vast majority of the cells found are lymphocytes, and the fluid is apt to be almost clear and show but few cells.





Figs. 3 and 4. Photographs taken of the same patient, a girl of sixteen, on the fourth day of illness, showing herpes on the cheek and on the back.

Finding meningococci in the spinal fluid is positive evidence of the disease. With the characteristic symptoms present and a negative bacteriological finding, if a count of from 70 to 98 per cent. polymorphonuclear cells is found the diagnosis may be made of one of the acute types of meningitis; and if the patient lives five days to a week or more, or if he recovers, that type is almost certainly meningococcic. Lumbar puncture is a justifiable differential diagnostic method to be used in all cases of meningitis. It has some curative value as well in the epidemic type.

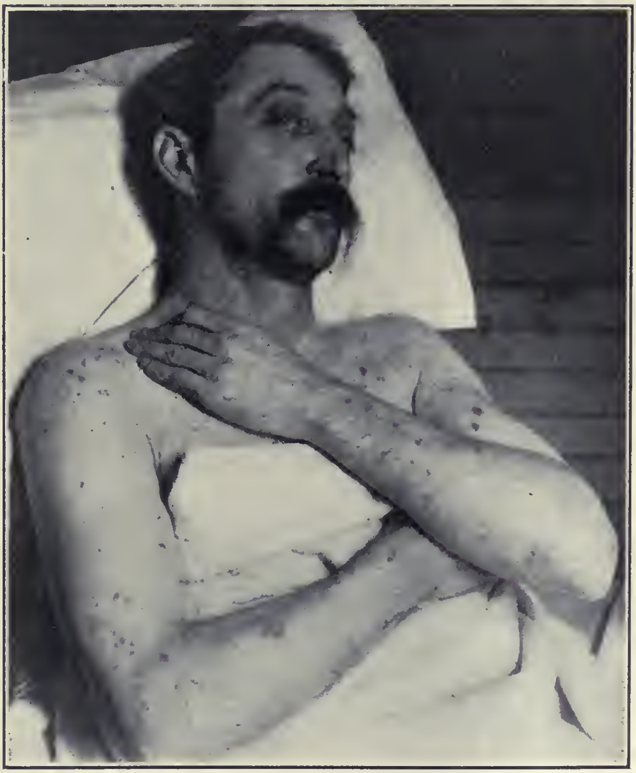


Fig. 5. Photograph of a man, forty-four years of age, taken when three days ill with epidemic meningitis. The petechiæ are a little larger and more numerous than is commonly seen in this disease.

If the disease continue without treatment, about the second or third day herpes very likely will be noted about the mouth or face, or occasionally on any of the skin surfaces (Figs. 3 and 4);

petechiæ on the chest, abdomen, or back are seen in a great many patients from the second to the seventh day; probably 10 or 15 per cent. will show spots in the skin varying in size from that of a pin's head to areas as large as the end of one's thumb. (Fig. 5.)

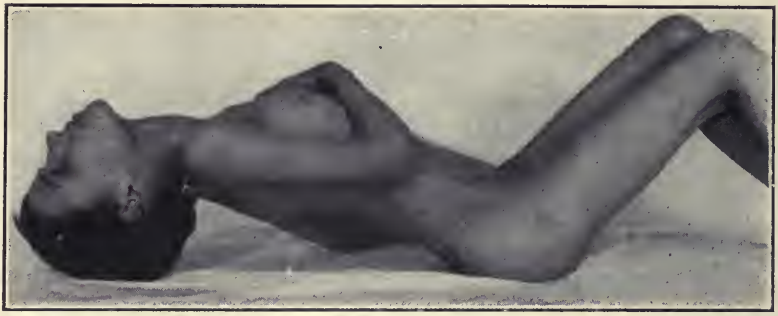


Fig. 6. Photograph of a boy, ten and one-half years of age, taken five days after the onset of epidemic meningitis, showing opisthotonus.

Retractions of the neck and back are apt to grow progressively worse, so that in some cases within four to five days after onset complete opisthotonus will be noted; pleurothotonos is occasionally noted, or rarely, as in the patient seen with Dr. Früh, lateral retraction of the head or torticollis is found. In some patients the retraction is limited to the neck; and it sometimes happens that there is nothing more than rigidity of the muscles of the neck with pain. Cases have been reported where, in addition to the rigidity and retraction of the back and neck, the masseter muscles are in such a state of tonic spasm that the patient may have his jaws locked as firmly as if he suffered from tetanus Emprosthotonos has been reported. (Figs. 6, 7 and 9.)

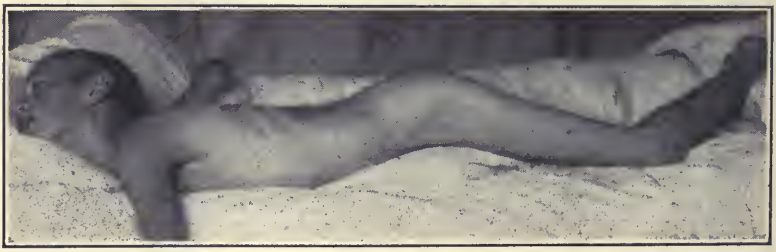


Fig. 7. A boy of thirteen lying in the usual position of those ill with epidemic meningitis.

Palsies are often found in the first week. I have had several patients come under my care in whom ptosis, or facial paralysis, was present on admission; and in a few cases complete hemiplegia was seen within a week or ten days. Marked strabismus was noted early in many patients. Blindness, partial or complete, is seen frequently. There is rather constantly a complete loss of control of both urethral and rectal sphincters, so that there may be either retention of urine, incontinence of urine, or incontinence of feces.

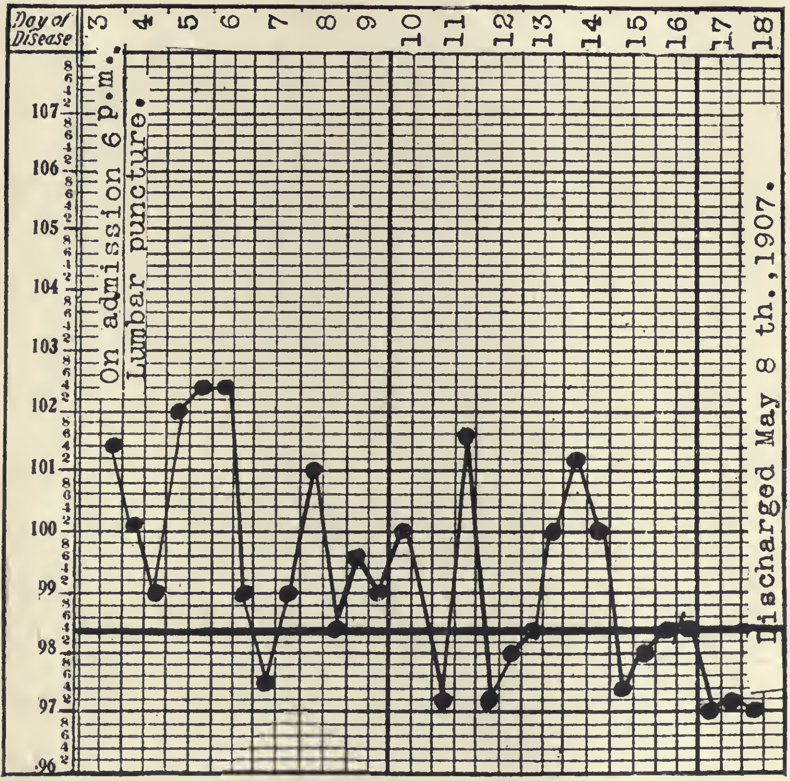


Fig. 8. Chart showing the fever early in the disease and the irregular type commonly developing later in the illness.

Deafness as an early symptom is frequent, and sometimes remains permanent. Next to scarlet fever and measles cerebrospinal fever is the most common cause of deafness. Headaches, severe in character, are almost constantly present.

The fever which is usually high at onset is apt to become very irregular, even early in the disease, and is of a most irregular hectic type later in the vast majority of cases. Indeed, this irregularity of the fever curve is so striking that some one has described it as fever of an "irregularly irregular type." (Figs. 8 and 10.)

In many patients early in the disease vomiting is almost constant. Food is usually retained; after a few days, however, but commonly after ten days or two weeks of illness, in those who survive so long, vomiting is resumed and continues in spite of treatment. This symptom is occasionally so persistent and so distressing that patients are literally starved to death. (Fig. 11.) With the irregular hectic fever comes the loss of desire for

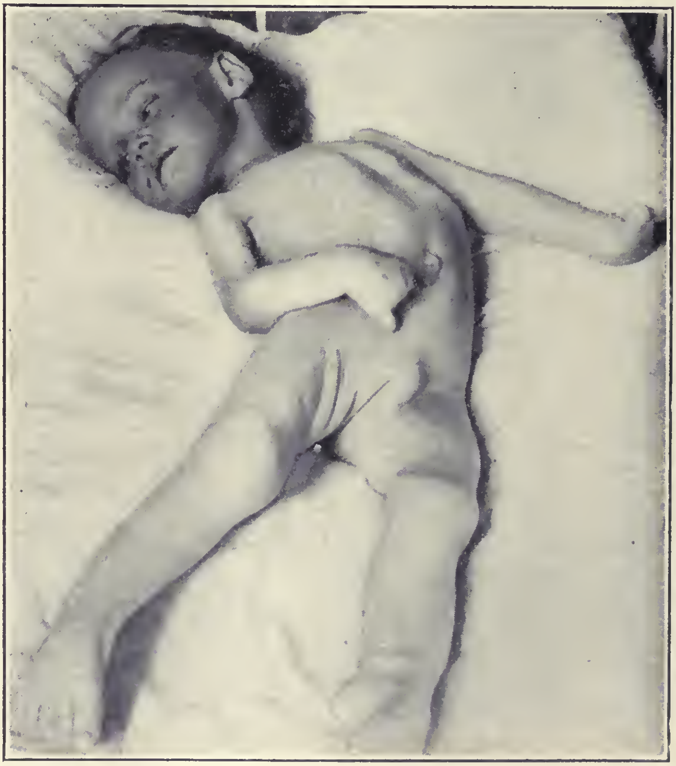


Fig. 9. A child of two and one-half years on the sixty-third day of epidemic meningitis. Excess of fluid in the ventricles responsible for pleurothotonos and for contractures of arms, hands and feet.

food, or lack of ability to retain it, and great wasting takes place. Later in the sickness many patients, who become chronic, seem to have a loss of digestive power, or rather loss of power to properly assimilate food; so that while food may be taken in sufficent quantity and may be retained, emaciation continues as if but small quantities were taken. The stools, however, show rather complete digestion in these patients, taking plenty of food and at the same time losing flesh.

Fortunately in this disease many die early and great suffering is spared the patient and his friends. Unfortunately, however, some are spared to suffer terrible sequelæ. Of the most vicious sequelæ, perhaps, permanent insanities are most to be dreaded, marked deformities due to muscular contractures, often so severe as to render the patient an invalid are more frequent; loss of vision, usually optic atrophy, in one or in both eyes, is rather common; loss of hearing, partial or complete, is frequent; and chronic headaches are apt to persist throughout life.

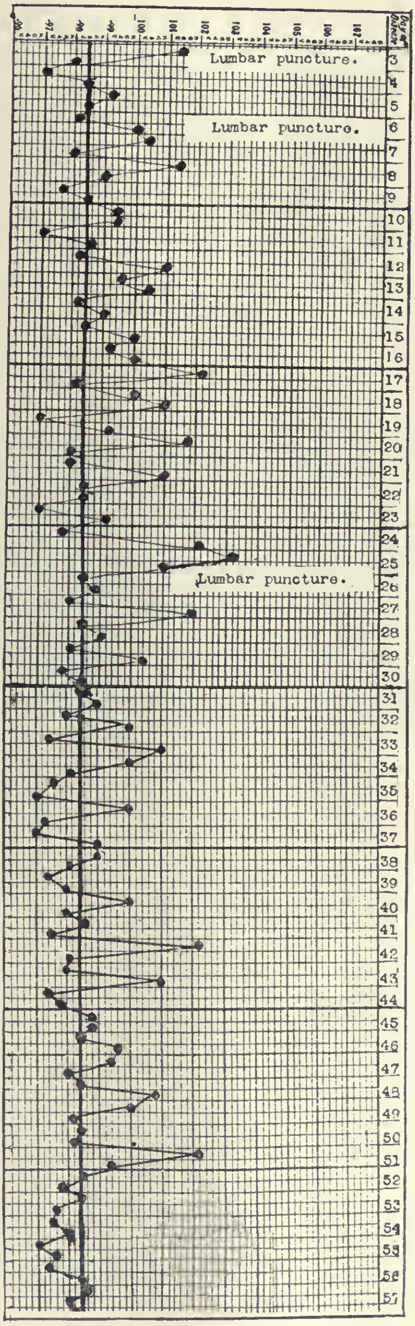


Fig. 10. Chart of a girl of seventeen years, running a chronic course with irregular fever. Patient recovered.

The prognosis in epidemic meningitis cannot be given with any degree of accuracy until the patient is actually well and free from symptoms for a period of months. Not that relapses are so frequent, though they do occur, but the unfortunate eye sequelæ, brain lesions, etc., sometimes come late in the disease.

In the fulminating cases death may usually be predicted; when two, three or four days have elapsed with the patient still alive and conscious, the chances are about equal for recovery; and with those that live a month or more, certainly 50 per cent. will survive the attack.

The mortality in cerebrospinal fever varies considerably with different epidemics. The usual death rate with ordinary methods of treatment runs from 60 per cent. to 75 or 80 per cent. in most outbreaks.

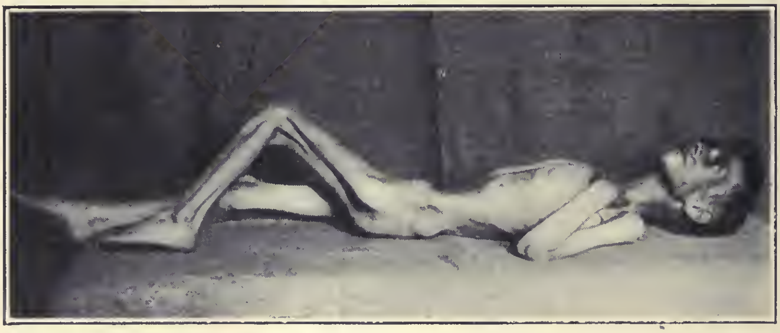


Fig. 11. A girl of ten, the sixty-fifth day, ill with cerebrospinal fever, great wasting had taken place, and vicious contractures of muscles of the left leg and thigh are noted.

Treatment* in meningococcic meningitis is most disheartening to doctor, to nurse and to relatives. Unless Flexner's serum proves to have virtue we must say there is no specific medicine for treating this disease. The most useful of all drugs in its treatment is morphin. With it the pain may be controlled, delirium may be lessened and sleep may be secured. Without it death is usually to be preferred. Next to the use of morphin the local use of ice gives greater relief than does any other remedy.

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* Since delivering this address the author has treated 17 patients suffering from epidemic meningitis with Flexner's serum, having but seven deaths in the series. This gave a death rate of 41 per cent. as against 60 per cent. in the same epidemic when treating patients by the usual methods. Three of these patients were unsatisfactorily treated. Excluding them the death rate is 28.5 per cent., or less than half the usual death rate. A full report of these cases will soon be published.

It is best applied by keeping an ice cap to the head and by having a specially devised ice bag applied along the spine. Lumbar puncture early, draining off nearly all available fluid, and repeating the operation on the appearance of pressure symptoms is useful and is sometimes almost theatrically curative. Alcoholic stimulants do good in a certain percentage of cases, and hydrotherapy is useful to a few patients. When the fever remains persistently high, cold sponging may be resorted to with comfort to the sufferer. Warm tubbing has had many advocates. I have not tried it in the acute stages. I do find, however, that in the later chronic stages of the disease a daily warm bath with massage is useful. Potassium iodid has been worse than useless in my hands, in that it not only caused no improvement in the patient, but it disordered the stomach so badly that food could not be retained. Strychnin and the bitter tonics are helpful in convalescence. I have used diphtheria antitoxin both intraspinally and subcutaneously without reducing the mortality. Many patients improve rapidly in the later stages by gentle massage and good feeding alone. The bromids and various coal tar narcotics are to be considered in the restlessness not due to severe pain. When in severe pain or suffering violent delirium our sheet anchors in treatment must remain at present, morphin, cold locally, lumbar puncture for pressure symptoms, sponging to reduce the temperature, alcoholic stimulation, careful feeding (in the early stages giving only liquids), and good nursing.

PAINLESS REMOVAL OF ADENOIDS.—Gradle (*Chicago Medical Record,* November 15, 1907) thrusts into the posterior wall of the pharynx, as high as possible after elevating the soft palate with a soft hook, a hypodermic needle, 10 c.c. long, after spraying with cocain, and injects a mixture of cocain and adrenalin. The needle is introduced through a blunt cannula as a guide. After ten minutes the operation will be painless. For the tonsils, if the child is submissive, about ten drops of a 1 per cent., or even 0.5 per cent., solution of cocain with adrenalin (1 to 4,000) is injected all around the periphery of the tonsil, and produces complete insensibility. Pain, however, is felt when strong traction is made, especially with the snare.—*Journal of the American Medical Association.*

LUMBAR PUNCTURE: ITS TECHNIQUE AND THE VALUE OF CYTO-DIAGNOSIS IN DIFFERENTIATING TUBERCULOUS MENINGITIS FROM THE EPIDEMIC VARIETY.

BY E. BURVILL-HOLMES, M.D.,

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It is somewhat surprising, in view of the comparative ease with which the operation can be performed, how frequently lumbar puncture is neglected, when much good, both from a diagnostic and therapeutic standpoint, or both, might accrue. We see cases showing signs of meningeal irritation discussed pro and con with the minutest detail; the patient's history, past and present, with the symptoms are entered upon; he is inspected, percussed and auscultated; the reflexes are tested, and yet the diagnosis remains a matter of baffling perplexity. Indeterminate as the case is, and eager as the clinician is to fathom the nature of the disease, either through personal timidity or apprehension that the operation might be fruitful of serious consequences, he fails to resort to the simple procedure which, in many cases, would transform his doubts into convictions. That lumbar puncture is not without danger, however, cannot be gainsaid, but accidents are certainly too infrequent to justify its condemnation. Giarre[1] reports 1 case in which unpleasant symptoms followed. Gumprecht[2] two deaths and another case in which paralysis followed the breaking off of the needle in the canal. The writer has performed the operation over 400 times, and has never met with an accident. But once has he seen a death that might be attributed to it.

TECHNIQUE OF THE OPERATION.

A general anesthetic may be administered if desired. Personally, I rarely use it, though in some cases a few whiffs of chloroform or ethyl chlorid have been given. Local anesthesia may also be resorted to, but usually the operation is over before the patient realizes what has happened to him, especially if the puncture is performed by a skilled operator who can plunge the needle into the canal without "feeling his way." It is surprising how easy it is after a little practice, to strike the canal at a single plunge.

To prepare the site for operation as one would for an abdominal section is unnecessary. Scrubbing the parts with tincture of green soap and water for a minute or two, and then washing with sterile gauze soaked with 95 per cent. alcohol is sufficient, and I have as yet to see infection occur after these simple precautions have been taken. The needle, it is needless to say, should be well boiled, and the operator's hands rendered aseptic.

As to whether the patient should assume the sitting or the recumbent posture is a matter of choice to the operator. Sahli[3] says that it is not well to try lumbar puncture with the patient sitting up, at least for therapeutic purposes, as certain disadvantages have been observed due to change of pressure. I always require the patient to sit up when circumstances permit. As a matter of fact one will often find that the fluid will not flow when the patient is in the recumbent posture, but will do so immediately when he is raised to the sitting one, and this when the needle has been left at the original point of entrance. And by the way it would be well to mention here that a "dry tap" does not necessarily mean that one has failed to reach the canal. The subarachnoid space may be obliterated by inflammatory products, thus effectually shutting off and isolating the ventricles. Or again the fluid may be so thick from the admixture of leukocytes that it cannot flow through the canula. Ofttimes when the fluid drops very slowly it can be hastened by the very simple procedure of moving the patient's head back and forth gently. The arc of its movement need be very small, and indeed it should be very small, as forcible or exaggerated movement produces great pain where meningeal trouble exists, besides causing harm. Blood dropping from the canula usually means that the spinal veins have been punctured.

The instrument to be used is also at the discretion of the operator. It may be either an ordinary hypodermoclysis or aspirating needle of the Tuffier or Pravaz type or a small trocar and canula. Whichever it is it should be 9 or 10 cm. long, with a lumen of at least 1 mm. in diameter. The trocar and canula is to be preferred, because if in plunging a hypodermoclysis needle in, one fails to strike the canal, a bent if not a broken instrument is the inevitable consequence.

The subarachnoid space can be reached by this operation at different levels in the lumbar region. It can either be between the third and the fourth lumbar, fourth and fifth, or what has been called "Chipault's sacrolumbar foramen"—the space between the last lumbar and the first sacral. Tuffier recommended that the space between the fourth and fifth be selected. However all these spaces are available, and it makes little difference at times which is the point of entrance, but since the morphological elements of the spinal fluid, leukocytes, blood and bacteria naturally tend to fall to the most dependent parts, it would seem that Chipault's foramen is the preferable site and should be sought when possible. It is not essential to compute the vertebræ, even if this were less difficult than it often is. I find that a convenient method is to feel with the thumb nail for the space between the processes at a level with the iliac crests, which is easy providing the patient is not too obese. As the iliac crests are at a level with the fourth spinous process, it is necessary to drop down to the next process, and the trocar is introduced one-half cm. beneath the latter and one cm. to either the right or left side at an angle slightly inward, upward and forward. In children the needle can be introduced in the median line, though in adults this is often difficult or impossible owing to the dense ligamentum interspinosum. The canal is reached at a distance of from 2 to 3.5 cm. in children and from 6.5 to 7 cm. in adults, varying in accordance with the obesity or muscular development. The amount of fluid to be removed depends a good deal on the motive which prompts its removal. For diagnostic purposes two or three cm. are sufficient.

NORMAL AND PATHOLOGICAL SPINAL FLUID.

The spinal fluid under normal conditions is absolutely clear with a specific gravity of 1.000 to 1.002 and contains a trace of albumin. Its reaction is alkaline. While not entirely without cellular elements, it is practically so, as it is only after a very long search over a great many fields that a single cell can be found. However, Brion,[4] in his exhaustive article, says that it is very difficult to say just where the line must be drawn between the normal and pathological fluids as regards their cellular content. He considers as normal a fluid that shows when examined under a microscope with a 7 Leitz lens, as many as four cells to a field. Widal, who first gave prominence to cyto-diagnosis, thinks that it is easy in most cases to determine definitely on examination whether the number of cellular elements is increased over the normal, an opinion with which the writer is heartily in accord. In most acute inflammatory conditions of the meninges the fluid on the other hand is turbid, the turbidity varying from a slight milky opalescence to a thick yellow fluid, depending on the number of cells—pus cells for the most part—which it contains. However, out of 150 or more cases of epidemic spinal meningitis, the spinal fluids of which I had the opportunity of studying at the Municipal Hospital, 1 case showed clear fluid almost accellular, yet contained a very large number of meningococci. This is nevertheless an exceedingly rare condition, and it can be accepted as a good working rule for diagnosis, that a clear fluid eliminates the probability of the epidemic variety of the disease. In meningitis due to the bacillus tuberculosis the fluid is usually clear, though ofttimes of a milky turbidity. In the clear fluid is frequently to be seen more or less fibrinous coagula in which the bacilli can be found. The reaction of the fluids in both the epidemic and tuberculous forms of meningitis is always alkaline. Chemically, pathological fluid contains more albumen than is present normally and the specific gravity is increased often to as high as 1.012. In some instances glucose is to be found.

CYTODIAGNOSIS AND ITS VALUE IN DIFFERENTIATING TUBERCULOUS MENINGITIS FROM THE EPIDEMIC VARIETY.

Eight years ago Widal and Rivault[5] published the results of their researches in connection with pleural exudates, and they claimed that by a study of the number and kind of the morphological elements contained in such exudates it was possible to diagnose their nature. The possibility of such deductions has also been claimed in regards to the spinal fluid. To this method of diagnosis the term "Cytodiagnosis" has been applied, and the following technique adopted with certain modifications. After collection the fluid is poured into a centrifuge tube and centrifugalized. The resultant sediment is at once smeared on a glass slide, stained, and an estimation made of the cells noted. Frequently one will meet with considerable difficulty in obtaining a satisfactory smear irrespective of what stain is used, owing to marked disintegration of the cells. As a general thing, any of the ordinary blood stains are suitable, or even Löeffler's methylene blue, unless an exhaustive study of the different variety of cellular structures is to be entered upon. The cellular structures for study are the polynuclear cells, lymphocytes—large and small—and endothelial cells. In a few of my cases of cerebrospinal meningitis basophiles were noted. As a matter of fact in the cases to be hereafter enumerated, the percentage of polynuclear leukocytes and lymphocytes were alone taken into consideration and the count based upon oil immersion fields, the ocular having been cross-haired to make computation the easier and somewhat more accurate. If desired, an Ehrlich ocular can be utilized. In estimating the cells Wolff[6] has drawn attention to the difficulty of differentiating lymphocytes from pseudolymphocytes, the former the variety usually found in the blood, the latter degenerated polynuclears as he opines or endothelial cells as is the opinion of Patella[7]. Personally I drew no distinction between them, and for so doing I have good precedent in the example of Widal, his pupils and others of the French school.

I took into consideration solely the percentage index of the polynuclear variety of cell and the lymphocyte, on the grounds that it is understood that a predominance of the former means an acute infective process, while tuberculous effusions exhibited a lymphocytic excess. Sahli[8], however, believes that the predominance of either variety of cell is less indicative of the etiology of the inflammation than it is of its stage and severity. Again a polynucleosis according to other investigators—Sicard for example—is only found at the fastigium, a lymphocytosis gradually replacing the polynuclear elements as the disease progresses toward chronicity. To the contrary Babinski in a case of three months standing demonstrated a polynuclear predominance. In 5 cases of the epidemic variety punctured late in the disease, I found the ratio of polynuclears to lymphocytes to be as follows:—

TABLE I.

Name.	Day of Disease.	Polynuclear Leukocytes.	Lymphocytes.	Organisms.
Case 1	41	73	17	—
" 2	67	84	16	—
" 3	31	91	9	—
" 4	40	86	14	—
" 5	91	98	2	—

Here we see a case even as late as the thirteenth week, which shows a marked polynucleosis and the patient in a convalescent state—at least with no apparent acute manifestations—puncture being made at this time to learn only if the organisms persisted at so late a day. Of course it is probable that had all of the 150 cases been punctured late in the disease and the percentage index studied a lymphocytic predominance might have been found in many of them. However, as it is during the early stages of the disease when a diagnosis is required the late lymphocytosis would not be any impediment to or detract from the value of cytodiagnosis. Early in the course of the epidemic variety of meningitis, and when I say early I mean cases of twenty-one days or less duration, polynucleosis invariably obtains, these cells being as numerous as 98 per cent. of the whole. The following table comprises a few of the cases:—

TABLE II.

Case No.	Day of Disease.	Polynuclears.	Lymphocytes.
1	1	81	19
2	2	93	7
3	2	95	5
4	2	98	2
5	3	93	7
6	4	90	10
7	4	97	3
8	5	93	7
9	5	91	9
10	6	91	9
11	6	96	4
12	13	73	27
13	17	97	3

But Bernheim[8] and Moser[9] in cases confirmed by autopsy and the presence of the tubercle bacilli in the spinal fluid have shown a polynucleosis to exist also in tuberculous meningitis, and Leukowicz goes so far as to state that 20 per cent. of such cases show a polynuclear predominance. On the other hand, Marcon Mutzner,[10] Tarchetti,[11] Guinon[12] and Brion claim this is exceptional, and Bernard, "that when it does occur in conjunction with tuberculous meningitis it is due to mixed infection."

During the recent epidemic of cerebrospinal meningitis 7 cases were sent into the hospital apparently suffering from the disease, but upon a lumbar puncture being made and the fluid examined a tentative diagnosis of tuberculous meningitis was made in 5 cases and a definite one of this form of the disease in the remaining two—in the latter because of the coexistence of the tubercle bacillus. At autopsy extensive tuberculous meningitis was demonstrable in the two last named cases (cases 1 and 2 in table 3). Cases 3, 4 and 5 were cases of marked miliary tuberculosis, miliary tubercles being evident in the lungs, liver and spleen. No macroscopical evidences of tubercles were seen on the meninges and the tissue was not studied histologically. No bacilli were found in the fluid, nor were any other organisms noted. Case 6 was of interest because here the spinal fluid showed an exclusive lymphocytosis, yet there were no macroscopical evidences of any meningitis whatsoever. The patient showed all the subjective and objective symptoms of meningeal involvement and died without regaining consciousness. Tuberculous involvement was limited to the lungs, none being found macroscopically or histologically in the spleen or liver. The brain tissue was unfortunately not studied histologically.

Table III.

Case No.	Day of Disease.	Polynuclears.	Lymphocytes.	REMARKS.
1	6	0	100%	Miliary tuberculosis. Meninges involved. Bacilli in fluid.
2	15	0	100%	Ditto.
3	15	0	100%	Miliary tubercles of spleen, liver and lungs.
4	4	1	99%	Ditto.
5	5	0	100%	Ditto.
6	3	0	100%	No apparent meningeal involvement. Pulmonary tuberculosis.

As an addenda to Table 3 I will cite 2 cases upon which I was recently requested to perform lumbar puncture, in order if possible to reach a diagnosis. One occurred in the practice of my associate, Dr. E. J. Beardsley. The patient was a little girl, of eight years of age, with marked pulmonary tuberculosis with cavity formation, who evidenced no symptoms of meningeal trouble except a slight continual headache. Meningitis was suspected, but as the symptoms were slight a lumbar puncture was performed with the hope of clearing up the diagnosis. The fluid was perfectly clear and contained no coagula. Microscopical examination however showed the cellular elements to be exclusively lymphocytes and tubercle bacilli were demonstrable. The second case was a man, on the service of Dr. D. J. McCarthy, at the Henry Phipps Institute, bed-ridden with advanced phthisis. He too complained of little else but headache which was continuous and a diagnosis of probable tuberculous meningitis was made. Lumbar puncture was performed, to substantiate the diagnosis, and while no tubercle bacilli were found in the fluid an exclusive lymphocytosis was noted. A few days later the patient died and extensive meningeal involvement was revealed.

One other case is of so much interest that I deemed it merited a little space and separate table:—

TABLE IV.

Case No.	Day of Disease.	Polynuclears.	Lymphocytes.	REMARKS.
7	3	96	4%	Suffering at this time from the epidemic variety of meningitis. Meningococcus isolated.
	54	0	100%	Bacillus tuberculosis has replaced the meningococcus. Fluid clear.

The patient was a schoolboy, of seven years, who was admitted to the hospital on the third day of an attack of epidemic cerebrospinal meningitis. Cytological formula was 96 : 4 with many negative diplococci which on culture proved to be the specific organism of the disease. The little patient slowly convalesced until the fifty-fourth day when it was deemed necessary to send him to another hospital for further treatment and care. He was lumbar punctured before his transference in order to ascertain if the organism persisted. The latter was not found, but in lieu many baccilli, which proved to be tubercle bacilli. The cytological count was now polynuclears 41 per cent., lymphocytes 59 per cent. Of course this lymphocytic predominance might have been but the evidence of the chronicity of the disease, nevertheless it is of interest to note that with the reversal of the cytologic formula the tubercle bacillus made its appearance. In comparing these cases then, despite the fact that those showing tuberculous involvement were few, it would seem that cytodiagnosis is at least of some value if not as Sahli expresses it, "the sole foundation for diagnosis." I believe that in cases of doubt, or when the meningococcus on the one hand and the tubercle bacillus on the other cannot be demonstrated, a cytological estimation is of great advantage and should be made, particularly when we have at our command an operation so easy of performance and practically so free from danger, if the ordinary precautions are taken, as is lumbar puncture.

2030 Chestnut Street.

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Bradycardia in Appendicitis of Children. — Bokay (*Deutsche Med. Woch.*, April 9, 1908) considers the subject of bradycardia in appendicitis, especially in children, and describes, with temperature and pulse curves, the cases of 10 patients from seven to sixteen years old. He finds that during the period of absorption of the exudate, slowing of the pulse lasting from several days to more than two weeks appears almost as a rule. The same thing may be observed after the drainage of an appendicular abscess, and here again the symptom may persist for days. Bradycardia may also follow removal of the appendix during the interval. The pulse rate in children of the age specified may go as low as 52, and in the author's cases it fluctuated between 52 and 80. There does not seem to be any relationship between the bradycardia and the temperature curve. Slow pulse under the above conditions is not an unfavorable sign, and when it appears in cases with periappendicular exudate it may indicate that absorption of the exudate has begun.—*Medical Record.*

AN ANALYSIS OF FOUR HUNDRED CASES OF EPIDEMIC MENINGITIS TREATED WITH THE ANTIMENINGITIS SERUM.*

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AND

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We have already reported concerning the effects of the employment of an antimeningitis serum, prepared in the horse by inoculation of *diplococcus intracellularis* and its products, upon the course and termination of a small number of cases of epidemic meningitis.† The results first presented were, on the whole, so satisfactory that we believed the employment of the serum on wider scale not only justified but clearly called for; and we are now in position to present a second series of figures which are based upon an analysis of about 400 cases of epidemic meningitis in which the serum has been used.

The cases of meningitis upon which this analysis rests have arisen in different and widely separated parts of the United States and Canada, and in Great Britain. They have occurred sometimes as small epidemics, as in Castalia and Akron, O., in Porterville, Cal., and, possibly, in other places in the United States, and in Belfast, Ireland, and Edinburgh, Scotland; and sometimes as sporadic outbreaks of considerable extent, as in Cleveland, Boston, Baltimore, Cincinnati and Philadelphia. Moreover, it is now evident that so-called epidemic meningitis is widely prevalent throughout the United States, and it would appear to be questionable whether any parts are really free from the disease. In view of the fact that we have demanded that the bacteriological diagnosis be made in every case of meningitis for which we have supplied the serum, and which we have accepted for our analysis, and that in doubtful instances we have ourselves examined slides and sometimes cultures prepared from the spinal exudates, we can speak with positiveness upon this important subject.

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* Read before the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 25, 1908.

† Journal of Experimental Medicine, 1908, x, No. 1. Independent publications have been made by Robb, British Medical Journal, February 15, 1908; by Dunn, Boston Medical and Surgical Journal, March 19, 1908; and by Chase and Hunt, Archives of Clinical Medicine, April, 1908.

It is an important matter, and one to be carefully pondered, whether the wide distribution of sporadic epidemic meningitis in the United States is the outcome and residue of the epidemic that raged in New York and vicinity from 1905 to 1907, or whether the disease tends to exist and has long existed in a sporadic state in this country, from which the severe epidemic outbreaks have occasionally taken their origin. There is some reason to suppose that the diagnosis of sporadically occurring cases of the disease may fail to be made unless attention is specially directed to the unusual symptoms by the simultaneous occurrence of several such cases, or by a wider publicity which the disease sometimes attains as through the existence of obvious epidemic foci, or, as in the present instance, by the interest excited by the publications relating to the antimeningitis serum.

The analysis which is to be presented is based upon histories of cases of epidemic meningitis in which the diagnosis has been established by bacteriological examinations as well as by the usual clinical tests. The histories have been supplied by physicians in hospitals and in private practice, who have employed the serum. It will not be possible in this place to acknowledge duly and by name the physicians who so generously gave their time to the study of the effects of the serum. But we hope soon to publish a full report of this investigation, when the awarding of due credit will be attempted.*

In making up the figures upon which the tabulations are based, account has been taken of the ages of the patients, the period of the disease at which the serum was first injected, the number of injections of the serum made, the dosage of the serum, the effects on the temperature, and the subjective and objective symptoms of the disease, upon the number and viability of the diplococcus in the spinal exudate, the general leukocytosis, the duration of the fever and other symptoms, the manner of recovery —that is, whether by slow improvement or lysis, or by abrupt termination of the symptoms or crisis—and some other details of the disease. Not all the points that have been developed can be brought out in this shorter article. But we wish to state that in one way only has any selection of cases been made, namely, that all cases which survived the first dose of serum less than twenty-four hours have been excluded from the tabulations. We consider that it may be accepted as probable that any marked benefit which the serum may be assumed to exert could hardly be effectively exhibited before the first twenty-four-hour period following its administration had elapsed. It has chanced that of the histories here analyzed the eliminations include chiefly cases which were moribund at the time of their admission to hospitals and the first serum injections and in which the survival was often only a few hours—one hour to five or six hours—and, in addition, a certain although small number of rapidly fatal fulminating cases.

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* To appear in Journal of Experimental Medicine, 1908, x, No. 5.

Result According to the Ages of the Patients.—The total number of cases subjected to tabulation is 393.* The total number of recoveries among these cases was 295 and the total number of deaths 98. Hence, there was 75 per cent. of recoveries and 25 per cent. of deaths. Tabulated according to the ages of the patients, the following is the result obtained:—

	No. of Cases.	Recovered.	Died.	Died.
Under 1 year	22	11	11	50 per cent.
Between 1 and 2 years	19	11	8	42.1 " "
" 2 " 5 "	68	52	16	23.5 " "
" 5 " 10 "	79	70	9	11.4 " "
" 10 " 20 "	105	80	25	23.8 " "
Over 20 years	87	64	23	26.4 " "
Age not given	13	7	6	46.1 " "

The youngest child who recovered was one month old. The latest case of the disease, in a child under one year of age, which was treated, was in its fourth month when the injections were begun: the child died. The highest mortality was among cases over twenty years of age, which can, we think, be explained in part by the fact that a larger number were treated by scattered physicians who had no experience with the serum. If this is not the reason, and adults past twenty are less subject to the action of the serum than younger persons, the fact will, of course, come out finally; but with one exception (Cincinnati), wherever a series of cases of these ages had been treated by one observer, the percentage of recoveries to deaths has been high. (Johns Hopkins Hospital, Baltimore, Cleveland, Belfast, Ireland.)

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* Representing the number after the moribund and fulminating cases have been subtracted.

Results According to the Period of Injection.—We have also analyzed the histories according to the earliest period of the disease at which the injection of the serum was begun. Not all the histories are perfectly definite on this point, and hence we have used in the analysis only those that are definite. In not a few cases the onset of the disease was insidious and the prodromata appear to have been indefinite and more or less overlooked. At other times, and this seems to have been the more frequent experience, the onset was abrupt, so that no special doubt surrounded the beginning of the disease. Under the circumstances, therefore, the danger is that the period elapsing between the onset and the symptoms of the disease, their recognition, the first serum injection, will be calculated too short rather than too long. It is very rare, except in the fulminant cases, that one can assure himself that he is dealing with the disease on the first day of its existence.

The histories of 361 cases were sufficiently explicit to enable us to approximate the periods in which the first serum injection was made. We have arbitrarily chosen the three periods that follow in which to group the cases:—

Period of Injection of Serum.	No. of Cases.	Recovered.	Died.	Died.
First to third day	123	107	16	16.5 per cent.
Fourth to seventh day.	126	96	30	23.8 " "
Later than seventh day	112	73	39	35 " "

In spite of the uncertainties surrounding the period of onset of the symptoms which affect the accuracy of the calculation of the period, the beneficial influence of early injection is rendered sufficiently obvious by the table. The period embraced in the last group is, of course, highly irregular, since not a few cases came under treatment when they were in a semi-chronic, or chronic, state after many weeks of illness. On the whole, therefore, the outlook even for the latter class of cases is not wholly discouraging; and, indeed, we are of the opinion that so long as the diplococcus is still present in the meningeal exudate and the mechanical damage to the anatomical structure is not irreparable, the employment of the serum holds out hope of considerable benefit.

Manner of Termination of the Symptoms.—The histories have been sufficiently explicit in 273 instances to enable us to determine the manner in which the disease terminated, that is, whether by lysis or crisis. We do not think that our decisions on this point have been uniformly correct and the figures are given, therefore, merely as an approximation of what may be found later to be the true figures. Of the 270 cases described in the histories, 200 terminated by lysis and 73 by crisis. Hence we have assumed that from 25 per cent. to 30 per cent. of the cases treated with the serum terminated abruptly in the manner to which we previously applied the term "crisis."

Closely connected with the question of the manner of termination of the symptoms is the question of the duration of the active symptoms of the disease in serum-treated as compared with non-serum-treated cases. Without entering into a discussion of this point we wish to state that we have analyzed 228 histories of recovered patients with reference to the duration of the active symptoms and found the period to be about eleven days.

Influence on Diplococci, Spinal Exudate and Leukocytosis.—In our first publication on the serum treatment of epidemic meningitis we drew attention to a fact, which impressed us as remarkable and significant, namely, that very soon after the serum injections were begun the diplococci tended to be greatly reduced in numbers, to disappear from the fluid part of the exudate, to become wholly intracellular (unless they were now entirely absent), to present certain changes in appearance, as swelling and fragmentation, and to stain diffusely and indistinctly, and co-incidentally to lose viability in cultures. The later and far wider experience has tended to confirm the views we first expressed based on the effects observed; and while exceptions occur in which the diplococci disappear or become engulfed and change in morphology or lose viability more slowly, yet the general fact seems securely established. There seems little doubt that part of the beneficial effect of the serum injections must arise from the restriction of multiplication and from the greater phagocytosis of the diplococci.

Attention was previously directed to the rapidity with which the exudate in the meninges loses turbidity under the influence of the serum injections. This fact has been noted again and again in the subsequent cases treated with the serum. Indeed, it would now appear as if the fear we expressed, that the cases with strictly purulent exudates might be less amenable to the action of the serum, was premature. A fair number of cases in which the notes state the spinal exudate to have been purulent have recovered, and the rapid clearing of the exudate was observed even in them. Whether there is complete anatomical restitution of the meninges in these cases can only be determined by postmortem examinations, but that complete functional restoration can take place may be regarded as certain.

Closely connected with the rapidity with which the cerebrospinal exudate loses pus cells and returns to a limpid condition, is the state of the general leukocytes of the blood. If the inflammatory emigration into the meninges is arrested, then the number of circulating leukocytes should tend rapidly to return to the normal. The facts at hand, based upon many counts of the circulating leukocytes before the injections of serum were begun, and afterward at regular intervals, show, as was to be expected, a fall, often very rapid and even critical, in the number of leukocytes in the general blood stream with which the disappearance of the diplococci and the clearing of the spinal exudate are correlated.

The reverse of the phenomena here mentioned is encountered in those cases not responding to the serum, or responding imperfectly, in which death is the result. Although the data bearing on this topic at our command are less numerous and perfect than the other, yet the general statement can be made that the diplococci, the spinal exudate, and the circulating leukocytes are less influenced in the resistant cases, and that progressive increase in turbidity of the exudate and rise in leukocytosis, and greater persistence of the diplococci with retention of viability after several injections of the serum, are unfavorable indications.

The data at hand, bearing on the meningeal phenomena that precede and attend the relapses so far as diplococci, exudate and leukocytosis go, are also imperfect. Here, again, the general statement can be made that the relapses are attended or ushered in by increased exudation of leukocytes into the meninges, higher systemic leukocytosis, and reappearance of, or increase in, the numbers of diplococci, although the diplococci may not regain power to grow outside the body in cultures. Relapses, in the course of the treatment, are not very frequent and rarely has the case terminated fatally during relapse when the treatment with the serum has been resumed without delay and vigorously pushed.

There remains one more topic to be mentioned. The indications given by the first series of serum-treated cases were to the effect that in the great majority of instances recovery from the disease would be complete. The facts brought out by the far larger series of cases on which this article is based, confirm the earlier view which we expressed. The number of complications which arose in them was small, and the only persistent defect noted was deafness. This lamentable condition occurred in a few instances only, and it was, more often than not, noted early in the disease before the serum injections were begun.

HUMAN MILK IN TYPHOID FEVER.—Denny (*Boston Medical and Surgical Journal,* May 9, 1908) describes the details of an investigation to ascertain whether or not human milk would avail to increase the complement in the blood in typhoid, and thus destroy the bacilli. It is beyond doubt that human milk in nurslings greatly increase their immunity to infections, and it is held to be also curative in its effects when used in the treatment of infections. There is no known necessary limitation to the period of this action. Milk, therefore, was drawn under the superintendence of a trained nurse from a few nursing mothers who had an abundant excess of milk—both mothers and children being previously examined and found perfectly healthy. Precautions were taken to have the milk drawn in a cleanly way into sterile bottles and kept at the right temperature. It was given in typhoid cases to patients in the same way as cow's milk, and was readily taken. While it is impossible to determine whether the human milk modified in any way the course of the disease, the author concludes that it is desirable that the milk should be tried in a larger number of cases and a study made of the blood of the patients taking the milk. He propounds for further investigation the question: "Can the protective power against infections which human milk gives to the infant be of value to human beings after the first two years of life?"—*Journal of the American Medical Association.*

PAPER ON THE SERUM TREATMENT OF MENINGOCOCCIC MENINGITIS.*

BY FRANK S. CHURCHILL, M.D.

I have had the opportunity to watch the effect of the Flexner antimeningitic serum upon 11 cases of undoubted meningitis—9 of the meningococcic type, 2 undetermined. Four of these have died—the 2 undetermined cases and 2 of the meningococcic type. Thus, 7 of the 9 cases of the latter variety have recovered, all without serious sequelæ.

All the cases were clinically meningitis and a diagnosis of the gross lesion could have been made without lumbar puncture, though, of course, not the type of the disease present. The chief interest in the cases has, of course, been in noting the effect of the serum. This has been striking. It has been noted upon the general condition of the patient, upon the temperature and leukocyte curves, upon the color and contents of the spinal fluid.

Usually the first effect noticed clinically has been the change in the patient's mentality. He would seem brighter and more rational after the first, second or third dose of the serum, as the case might be, and this improvement continued steadily until the patient was well. It was a curious sight to see the patient lying in bed with head markedly retracted, yet perfectly quiet and without pain, interested in his surroundings, for the rigidities persisted after the mental state began to clear up. Kernig's sign was particularly persistent in some cases.

The leukocyte curve was an interesting phenomenon. There was, of course, a considerable leukocytosis at the outset of treatment, but after the use of the serum there was almost invariably a drop in the leukocyte curve, together with a drop in the temperature curve.

The effect of the serum upon the spinal fluid was striking. At the outset of the disease the fluid was, of course, cloudy; in 2 cases, purulent. Examination of the first specimen of fluid obtained generally showed considerable numbers of leukocytes of the polymorphonuclear variety and also meningococci, varying in numbers with the intensity of the disease. Subsequent punctures showed a fluid less cloudy, and, by actual count, a diminishing number of cells and organisms. The latter were found both extra- and intracellular.

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* Abstract of article read at the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 25, 1908.

In view of what we now know of this antimeningitic serum, I believe we are justified in this opinion: given a case, evidently meningitis, it is our duty to do a lumbar puncture, and if we obtain a cloudy fluid to inject the serum at once into the spinal canal, subsequent injections being determined by the results of the bacteriological examination of the spinal fluid. If this show the presence of the meningococcus, the serum should be repeated every day for three or four days if necessary. If relapses occur, we should resort to the serum again.

BURNS AND SCALDS IN CHILDREN.—Leale (*Medical Record,* May 9, 1908) discusses the various factors operating in the case of burns. In regard to treatment, it is of paramount importance to see that everything coming into contact with the wound is sterile. The wound must be carefully freed from all foreign substances, and vesications be carefully drained, as their serum, plus fibrin ferment, on coagulation forms an excellent culture medium. He recommends irrigation of the wound with an antiseptic solution, preferably a warm aqueous solution of peroxid of hydrogen (1 to 6 or 1 to 10), followed with an irrigation of warm normal saline solution or a 3 per cent. solution of boric acid. Protection of the wounded surface is the next important factor, and for this he prefers a thin ointment made fresh at the bedside with a pure sterile oxid of zinc powder and pure olive oil rendered sterile by boiling. When the papillary layer is involved, it is best protected by rubber tissue or silver foil in overlapping strips from half an inch to one inch wide, thus allowing the escape from the wound of discharge, which is immediately taken up by the overlying layers of gauze that are nowhere in contact with the wounded surface. He accentuates the great importance of constitutional treatment.—*Journal of the American Medical Association.*

THE SERUM TREATMENT OF EPIDEMIC CEREBROSPINAL MENINGITIS, BASED ON A SERIES OF FORTY CONSECUTIVE CASES.*

BY CHARLES HUNTER DUNN, M.D.,
Boston, Mass.

The report is based on a series of 40 consecutive cases of epidemic cerebrospinal meningitis, treated with Dr. Flexner's antimeningitis serum. All cases in which the diplococcus intracellularis was found in the cerebrospinal fluid, without regard to the type of case or the stage of the disease, are included in the series. The antiserum was administered in all cases by injection into the cerebrospinal canal according to the technic recommended by Dr. Flexner and described in a previous publication. As soon as a suspected case was reported to me, lumbar puncture was at once performed. If the cerebrospinal fluid obtained was cloudy, the antiserum was injected at once, without waiting for the bacteriologic examination of the cerebrospinal fluid, and if fluid was clear no antiserum was given until subsequent examination revealed the presence of the diplococcus intracellularis.

In those cases in which a rapid and marked improvement in the symptoms occurred after the first injection, accompanied by a permanent fall of temperature to the normal, no further injection was given. In those cases in which this did not occur, the injections were repeated daily until nervous and subjective symptoms were completely relieved and the temperature had reached the normal, or until four doses had been given. In resistant or relapsing cases further doses were given according to circumstances. The routine dose was 30 c.c.; in many instances larger doses were given, the maximum being 45 c.c. In some instances, when the amount of fluid obtained was small, and in all instances when too great an increase of intradural pressure was feared, smaller amounts were injected, the minimum being 10 c.c. This was the general routine; there were some exceptions.

The serum has been used in 45 cases of epidemic cerebrospinal meningitis, but cases still pending are not included in the series. Of the 40 finished cases nine patients have died and thirty-one have recovered. This is a mortality of 22.5 per cent. and a rate of recovery of 77.5 per cent. Of the 31 cases in which the patients recovered, two were left with sequelæ, one being deaf and one both blind and deaf. The recovery was complete in 29 cases, or in 72.5 per cent.

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* Abstract of Paper read at the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 25, 1908.

The type of disease prevailing this year in Boston and vicinity was no milder than that which prevails every year.

I have not been able, for purposes of comparison, to collect enough cases treated in Boston and vicinity this year without the antiserum. It is possible, however, to compare the mortality at the Children's Hospital this year under the use of the antiserum with the mortality in other years under other methods of treatment, as sufficient cases have been treated in this hospital each year to afford a basis for such a comparison. While the number of cases treated each year varies, the average yearly number for the last ten years is twenty. This comparison also throws light on the comparative value of the treatment with the antiserum and of other methods.

It appears that the lowest mortality of any year before this was 58 per cent., and that it varied between 58 per cent. and 80 per cent., but that this year, under the use of the Flexner antiserum, the mortality has shown a remarkable drop to only 19 per cent.

The 9 fatal cases in the series throw a certain amount of light on the limitations of the value of the serum. Of these nine, five were cases seen late in the course of the disease, at a time when the patients were in the well-known chronic stage, unconscious, and without fever or active symptoms. In one of these the serum was not given until the patient was actually moribund. Of the other 4 cases, one was of the fulminating type, one a very severe case, and one patient died of an intercurrent bronchopneumonia, coming on after the temperature had come down to normal and all meningeal symptoms had subsided. The last case was one of average severity, in which the serum appeared to produce a slight improvement in the beginning, but which later appeared uninfluenced by the antiserum, advanced into the chronic stage, and a fatal result ensued after many weeks of illness.

My belief in the great value of the Flexner antimeningitis serum is based not chiefly on its apparent effect on the mortality of the disease, but on the very marked and striking effect which its use appears to produce in individual cases. It so modifies and changes the course of the disease as to present a very sharp contrast with the course usually seen in cerebrospinal meningitis treated by other methods.

The three principal effects of the use of the serum seem to be: First, to produce a fall of temperature; second, to produce a rapid improvement in the patient's general condition, accompanied by a more or less marked relief of certain symptoms; and, third, to cut short the course of the disease.

The most striking effect on the temperature is a permanent critical fall following the first dose of serum. Other cases showed a similar critical fall of temperature, which was, however, not permanent, the temperature rising again and finally coming down by lysis. Another effect was seen in a rapid permanent lysis, which was very striking in cases in which there had been a consistent high temperature up to the time when the first dose of serum was given. In other cases temporary relapses occurred, and in some there was no immediate effect.

The effect on the symptoms and general condition is the most striking phenomenon observed with the use of the serum. In some cases there occurred a permanent return to consciousness, a disappearance of mental dullness, a disappearance of delirium, and a disappearance of headache, hyperesthesia, tenderness of the neck or vomiting. These symptoms were often relieved completely within twenty-four hours after the first injection, the patient changing in the most remarkable way from a serious condition of coma to a favorable condition of normal mental activity.

At other times the improvement in this set of symptoms occurred more slowly, and at still other times, particularly in the late chronic cases, no such effect was noted.

As to the cutting short of the disease, the average length of time which patients remained under treatment was but a small fraction of the time which patients who recovered, remained under treatment at the hospital in previous years.

Another notable effect of the serum is seen in the successive examinations of the cerebrospinal fluid during the period of its use. This effect is most striking in early cases, in which the cerebrospinal fluid contains large numbers of diplococci. In such a case a great many intracellular diplococci are observed in the fluid withdrawn by the first lumbar puncture. Twenty-four hours after the first injection the fluid presents a strikingly different picture. The whole number of organisms seen is much smaller, but the chief change is that the majority are intracellular, only rare extracellular forms being seen. The third lumbar puncture shows still fewer diplococci, and those only intracellular. In the fourth fluid, after three doses, there are frequently no diplococci to be found, or, at most, very rare intracellular forms.

Relapses sometimes occur under the use of the serum. In a relapse, after a period of improvement, the symptoms begin to recur and the temperature to rise. These relapses usually yielded to repeated doses of antiserum.

The completeness of recovery is another noteworthy point in this series. There were sequelæ in 2 cases only, one child being deaf and one blind and deaf.

The results of the use of the serum appeared to depend chiefly on how early it was first used. The earlier it was employed the more marked were its effects.

We may conclude that the prospects of aborting or rapidly cutting short epidemic cerebrospinal meningitis are better the earlier in the disease the serum is given, and that the antiserum usually has no effect in the late chronic stage. There were cases which proved exceptions to this rule, as in 3 cases in which the serum was used comparatively early the patients died. On the other hand, one patient in the late chronic stage began to improve immediately after one dose of serum and made a rapid convalescence. This would show that there is always some hope of a good result so long as diplococci are present. I believe the serum in most cases causes a cessation of the active process and that the resulting course of the disease depends mainly on the extent of tissue damage which has already been done.

As to the amount of serum which should be given, I believe that 30 c.c. can be given usually with perfect safety, even when smaller amounts of fluid are withdrawn. I have given, without any bad results, as much as this when no fluid was withdrawn. One can judge to a certain extent how far it is safe to go by the feeling of resistance to the injection of the serum. In cases in which larger amounts of fluid are withdrawn I believe 45 c.c. should be given at a dose.

The daily injection of the serum in most cases seemed to be effective. After four doses have been given, if, after one or two days the case proves resistant, or at any time if there is a tendency to relapse, this treatment should be repeated. It is a question whether in some severe cases the serum should not be administered oftener than once in twenty-four hours.

I conclude from this series that:—

(1) The use of the Flexner antiserum is of great value in epidemic cerebrospinal meningitis. I believe its value to be comparable to that of diphtheria antitoxin in diphtheria.

(2) The use of the serum at times aborts the disease, frequently rapidly relieves its symptoms, shortens its course, lessens the liability to sequelæ, and greatly reduces its mortality.

(3) The serum should be used as early as possible in all cases, even of suspected epidemic meningitis.

(4) It should be frequently repeated as long as there are symptoms or any tendency to relapse.

(5) Late chronic cases are unfavorable for the use of the serum, but any case in which the diplococci are present has some hope of relief by its use.

(6) Some cases are resistant.

EPIDEMIC CEREBROSPINAL MENINGITIS.—Chase and Hunt (*Archives of Internal Medicine*) report the case histories of 12 patients with epidemic cerebrospinal meningitis treated at the Akron City Hospital during the epidemic of 1907. All these patients were treated with the Flexner serum, the only other medication any of them received being an occasional hypodermic of morphin, with hyoscin hydrobromid when delirium and restlessness were pronounced. Three patients died and 9 recovered, a mortality of 25 per cent., while of the patients outside, none of whom received the Flexner serum, 1 patient recovered and 9 died, a mortality of 90 per cent. The cases in the hospital were, for the most part, fulminating and all of them were severe. In one of the fatal cases serum was not used until the patient had become pulseless; in another improvement following the first injection was very marked. While not building too much on this small number, the authors consider that the difference in mortality of those treated with and without serum is not due to a greater severity of type in the latter.—*Journal of the American Medical Association.*

HYDROCEPHALUS OF MENINGOCOCCUS ORIGIN, WITH A SUMMARY OF RECENT CASES OF MENINGITIS TREATED BY ANTIMENINGOCOCCUS SERUM.*

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AND

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Introductory.—An increase in the cerebrospinal fluid in inflammation of the meninges has been recognized for many years. Judging, however, from the comparatively small number of cases reported, the definite association of hydrocephalus with cerebrospinal meningitis has not attracted wide attention. This is in part explained by the insidious onset which frequently characterizes hydrocephalus, masking its connection with an antecedent attack of meningitis. Moreover, an increase in intraventricular fluid when of moderate degree in an adult skull, which admits of no dilatation, produces a rather vague and uncertain train of symptoms and may so escape detection. However, in nearly all the text-books, cerebrospinal meningitis is set down among the several causes suggested for the remarkable condition, hydrocephalus, the pathology of which is still so unsettled.

Historical.—Joslin,[1] in a partial review of the history of internal hydrocephalus following cerebrospinal fever, finds that in the same year, 1805, in which epidemic cerebrospinal meningitis is considered to have appeared, a case occurred in Strasburg having typical symptoms, and which on autopsy besides the meningeal congestion and inflammation showed the ventricles to be dilated with turbid serum.

A good description of this complication appears in Foerster's text-book of "Pathological Anatomy,"[2] published in 1863. Two years later, Ziemsen and Hess[3] especially directed attention to hydrocephalus during an epidemic of cerebrospinal meningitis in Erlange. They reported 4 cases with autopsies. Several additional instances have been published, among others, by Merkel,[4] Niemeyer,[5] Bohmer,[6] Bonsaing,[7] Pimser,[8] Collins,[9] Hart,[10] and von Hartung.[11] The clinical symptoms and the pathological findings of the reported cases show striking similarity. After the acute symptoms of onset there may be marked improvement, which continues indefinitely, or may be interrupted by paroxysms of severe headache, pain in neck and extremities, vomiting, loss of consciousness or convulsions; often there is fever. These symptoms may subside and remain absent for long periods, during which the patient may appear quite well, although abnormalities in the power of concentration or in reflex reaction are usually present. In a number of cases there is no period of convalescence, the symptoms attributable to the hydrocephalus following immediately after those of the meningitis.

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* Read before the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 25, 1908.

According to Ziemsen,[12] to whose description of the anatomical findings in 1874 little has been added, after the second or third week the meningeal exudate begins to break down and to be absorbed, and there is an increase in the connective tissue of the serous membranes. The hyperemia of the brain, which marks the acute stage, subsides. At the same time, usually in about the fifth to eighth week, the exudate in the ventricles becomes purulent. Still later there is hyperplasia of the ependyma, then often fibrous thickening. The ventricular exudate increases in amount, becomes clearer, the cellular contents tend to sink to the posterior horns. In many cases there is definite edema of the brain substance. The choroid plexus becomes blanched. The brain tissue softens, is continually pressed upon by the increasing fluid and gradually atrophies—it may be to a mere shell. Most of the cases prove fatal before these advanced changes take place. The inflammation appears to be carried to the ventricular ependyma along the course of the blood vessels, extending into the brain substance from the meninges. Merkel (loc. cit.) found an extensive cellular proliferation about the vessels of the ependyma and plexus. It is probable, too, that a venous stasis is partly brought about by increased intraventricular pressure, and so further infiltration of fluid is encouraged.

Hulsmann,[13] who makes this condition the subject of his inaugural dissertation, reports a remarkable case, which shows how extensive the cerebral alterations may be without symptoms. The patient was a child of three years, who was suddenly seized with the symptoms of cerebrospinal meningitis. There was well marked opisthotonus, violent vomiting and fever. After a short period of improvement, convulsive attacks set in and returned at frequent intervals. The patient lost weight rapidly, and after three and one-half months was greatly wasted and showed signs of mental impairment. The sight became completely lost. From this condition the boy gradually improved, and in another month had, to all appearances, recovered complete health. The eyesight returned completely, and the mother considered the patient the brightest of her several children. After eight months of perfect health the child, together with several other members of the family, died of diphtheria. On autopsy, a pronounced hydrocephalus was found. All the ventricles were dilated, and there was well-marked granulation and thickening of the ependymal lining—evidently the result of the previous meningitis.

An apparently identical condition in an infant is also reported by Grosz[14] in 1899. The patient, a boy of ten months, was brought to the hospital with the history of having been seized six weeks before with fever and repeated convulsions. The head was retracted. A month later the symptoms subsided, but the eyes were crossed and five days before admission became blind. On examination the head was found to be large, the sagittal sutures open and the anterior fontanel bulging. The pupils did not react to light or accommodation; the eye grounds were normal. There was slight light perception. Evidently an internal hydrocephalus had followed the meningitis and the blindness resulted from increased intracranial pressure. Through a ventricular puncture, 40 c.c. of clear fluid were removed, which was followed at once by an improvement in the child's general condition. The eyes became less crossed. At a second puncture, a few days later, 70 c.c. of fluid were removed. Convalescence afterward was uninterrupted and the child's condition was reported excellent eleven months after leaving the hospital.

Dr. Osler,[15] under the title, "Chronic Meningitis," and, lately, Cuno,[16] of Frankfort, report somewhat similar cases.

Cases in which permanent mental impairment has followed the development of internal hydrocephalus after meningitis have been reported by Heubner,[17] Hulsmann,[13] and many others.

Holt,[18] in 1887, published an instance of chronic hydrocephalus in a child of thirteen months. The enlargement of the head had been noticed at three months, and the patient's development had been much retarded. On section marked pachymeningitis was found over the whole brain. The ventricles were much dilated. There were no signs of acute inflammation and no history pointing definitely to cerebrospinal fever.

In the exhaustive treatise of Councilman, Mallory and Wright[19] on "Epidemic Cerebrospinal Meningitis in 1898," little mention is made of hydrocephalus, but in the autopsy records of 35 cases the lateral ventricles were found to be dilated in at least 5 instances, and in 5 others the exudation at the base was described as abundant. In a majority of these cases, the ependymal lining of the ventricles was shown to be granular.

Wentworth[20] in the same year, when an extensive epidemic of cerebrospinal fever occurred in Boston, did not refer specifically to cases of hydrocephalus in infants as a consequence, but did report a case of chronic meningitis with autopsy, in which the ventricles were dilated. The condition was not especially associated with meningitis by Koplik,[21] who described the clinical features of the many cases coming under his observation in the New York epidemic of 1903 and 1904.

In the "Reports of St. Thomas Hospital, London," for 1899,[22] an instance of acute hydrocephalus following typical meningitis is described in a man aged thirty. The illness was of but five weeks' duration. On autopsy the ventricles were found to be dilated and the membranes opaque and thickened.

A year later Joslin,[1] of Boston, reported 8 similar cases in patients between sixteen and thirty-two years of age. There seems to have been no special association between the severity of the meningitis and the development of the hydrocephalus. In several instances a number of weeks elapsed between the termination of all signs of meningitis and the onset of symptoms referable to hydrocephalus. There were headache, vomiting, restlessness, occasional delirium and convulsions. Strabismus and a return of fever were often noted. On autopsy, in all of these cases, in addition to the dilatation of the ventricles, the ependymal lining was found to be swollen and granular and floor of the fourth ventricle thickened. In the horns of the lateral ventricles were collections of fibrin-like flakes. The pia mater was much thickened, especially along the course of the blood vessels. In several of the cases cultures were taken from the ventricular fluid and were found to be sterile.

A case somewhat similar to those we shall here report was seen by Northrup[23] in 1896. It concerned a boy of three years, who ran a course of what was clinically cerebrospinal fever. After four months he seemed to have completely recovered, but died six months from the onset of illness. On autopsy the convolutions of the brain were found to be much flattened and the ventricular fluid four times the normal amount. The ependyma were granular. There was no evidence anywhere of tuberculosis.

Our attention has been directed to this increase in the intracranial pressure as a result of cerebrospinal fever due to infection with the meningococcus by the two following cases:—

CASE I. A baby aged five months, was seen in consultation on November 7th last year. The family history was unimportant. The birth had been normal and the child had flourished for two months at the breast. At this time it was weaned and there had been some indigestion on artificial feeding, with little gain afterward.

The present illness began seven weeks before, when the baby, without warning, was seized with a general convulsion, followed by vomiting and fever. These symptoms abated and after two weeks the child seemed to be becoming better when the fever returned and the stiffness of the neck was noticed. Since this time there had been a continuous irregular fever and occasional convulsions, which were becoming more frequent. There was also frequent vomiting, although the stools were normal. When seen, the baby was lying with head much retracted. The head was large, being about 44 cm. in circumference. The anterior fontanel was tense and bulging and the bones of the head unduly separated by intracranial pressure. The pupils were contracted and reacted sluggishly to light. The chest was clear; the heart action was markedly irregular. The abdomen was negative, the skin evidently hypersensitive to pressure. Kernig's sign was positive. It was, of course, clear that the child had meningitis, and that many of the alarming symptoms were due to increased cerebral pressure. Lumbar puncture was immediately performed, and 100 c.c. of slightly turbid fluid under high tension was withdrawn. This fluid was found to contain many pus cells and a small number of intracellular diplococci. The use of the Flexner serum was suggested, but declined. It was not urged, because it was then felt that in cases of such long standing it would be of little service. For several days afterward the symptoms abated, but on November 13th, a week later, it was necessary to repeat the puncture; 100 c.c. of fluid of the same character was removed. The patient was seen by us on these two occasions only. For several weeks from this time the child was said to be better. He took nourishment well, was in less pain and the convulsions had almost ceased. The retraction of the neck, however, persisted. Late in December the father said the baby was much improved and asked about engaging a nursery maid. A few days later the child died suddenly, four months after the onset of symptoms. No autopsy was obtained. Diagnosis: Acute, then chronic, cerebrospinal meningitis of meningococcus origin; acute internal hydrocephalus.

CASE II. In March of this year one of us was asked by a nurse at the milk dispensaries to see a child in South Baltimore, who had recently begun taking milk at the station, and who appeared very ill. The patient, a boy of six months, was found lying on a pillow. The size of the head at once attracted attention. It was considerably enlarged and had to be supported. The baby was much emaciated and very fretful. The history at that time was most indefinite. No reason for this condition could be assigned by the parents. The mother had first noticed the enlarged head about five weeks before. The left side of the head bulged out distinctly more than the right; the scalp on the left side seemed a trifle reddened. The baby's birth was said to have been normal. It had been breast-fed for two months, afterward it was fed, for the most part, on cow's milk. There had been constant indigestion; there was no stigmata of rickets.

The anterior fontanel was large and tense and the bones of the head widely separated. It was not clear just what the condition was which was responsible for increase in the intracranial pressure. A neoplasm was suspected. The parents were persuaded to come to the dispensary, where a consultation was obtained with Dr. Cushing. Dr. Cushing did a lumbar puncture, but obtained only a few drops of serous fluid. He then punctured the ventricle and removed 120 c.c. of straw-colored fluid. A crinoline bandage was applied and the child sent home with the diagnosis of chronic internal hydrocephalus, probably of congenital origin, the thought being that the parents had not detected the early enlargement of the head.

When the fluid from the ventricle was examined by Dr. Sladen, it was found to contain many extra and intracellular diplococci, which on culture proved to be the diplococci of Weichelbaum. The patient was sent for and admitted to Dr. Barker's service on March 21, 1908, that he might be treated with the antimeningococcus serum. In the ward, on close questioning, it was discovered that four months before, at the age of two months, the child had once waked from sleep moaning, evidently suffering great pain. One hour afterward it had a general clonic convulsion lasting two minutes, followed by several others less severe the next day. For the following four days and nights the child cried constantly. The eyes were crossed, and he was feverish. The only other convulsion occurred three weeks after this onset. During the last three months the patient had constantly lost in weight. The increase in the size of the head began five weeks before admission. He had been treated in his home for pneumonia, muscular rheumatism, indigestion and intestinal rickets.

On admission, the child was found to be as already described, an extremely emaciated baby. Both fontanels bulged and the head sutures were gaping. Circumference, 46.5 cm. The pupils were wide and reacted to light. The head was somewhat retracted and the neck held stiffly. The back was not arched. The chest and abdomen presented no abnormalities. The knee kicks were not obtained. Kernig's sign was not positive in either side. The leukocytes numbered 17,000.

By a second lumbar puncture about 2 c.c. of a blood-stained fluid were obtained. This was sterile. The child was put on a milk and oatmeal water diet and given a hot bath and a cocoa butter rub every day. His general condition improved after admission until just before the final collapse. He took nourishment greedily, slept soundly and gained 250 grams in fourteen days in spite of several ventricular punctures. Examination of the eyes by Dr. Bordley disclosed double choked disk, the one near the papillæ being large and tortuous. Fluid was removed by tapping the ventricle on four additional occasions, five in all, March 28th, 31st, April 3d and 8th, at which times 150 c.c., 100 c.c., 60 c.c. and 140 c.c., respectively, were taken. Antimeningitis serum (Flexner) was given immediately after four of the tappings, each time 15 c.c. were injected, the first time into the lumbar meninges, the other times into the ventricle. None of the taps seemed to disturb the patient very much. There was no collapse. The meningococci were found each time in the cerebral fluid, but seemed fewer in the fluid last removed. The child ran an irregular temperature, ranging from 96.4° to 101.8°. The respiration varied from 24 to 40, the pulse from 100 to 50.

Early in the morning of April 8th, when symptoms seemed favorable, the patient suddenly went into collapse; Cheyne-Stokes' breathing developed, due apparently to a sudden increase in intraventricular pressure. A ventricular tap was done four hours later, but the patient did not rally and died at noon. No autopsy was allowed.

These cases are reported because the number of similar instances in which the causal organisms have been found in the hydrocephalic fluid are certainly few. The symptoms of the condition have been dwelt upon sufficiently in recounting the cases. The length of time the meningococci remained viable in the ventricular fluid from the onset of symptoms is noteworthy, and suggests that similar findings may be true of some of the cases thought to be idiopathic hydrocephalus.

The uncertainty of the outcome has recently been emphasized by Huber.[24] As regards the prevention or cure of the condition there is much of encouragement in the results obtained in the treatment of cerebrospinal meningitis by the specific antiserum. Unquestionably the inflammatory process produced by the meningococcus causes the initial reaction in the ependymal lining leading to increased exudation of fluid. When this is present in excess it may readily tend to produce venous stasis, and so further increase the condition. If the serum treatment provides an efficient opponent to the action of the specific microorganism, the number of cases of meningitis that advance to the stage of hydrocephalus should be further lessened, and, moreover, the condition itself, when due, as it was in the last case cited, to viable cocci, should yield to intraventricular injection. The immediate effects of cerebral hypertension can be, to a large extent, avoided by occasional lumbar or ventricular puncture.

Through the courtesy of Dr. Barker, in addition to the foregoing case, we are permitted to present a summary of the cases of meningococcus cerebrospinal meningitis treated by an antimeningitis serum (Flexner) in the wards of the Johns Hopkins Hospital during the past year. Two of these cases were seen by one of us before they entered the hospital and will be referred to briefly. The first concerns a boy, white, aged fifteen years, seen with Dr. H. L. Whittle, of Baltimore. His family and personal history were good. There had been few previous illnesses. The patient had complained eighteen days before of chilly sensations and pains in the limbs. At that time he had a cold, coryza and cough with expectoration. His appetite was impaired, and he felt ill, but continued at work, that of a clerk. Sixteen days later he was obliged to stop work on account of a severe frontal headache. He complained also of pain in his back, and his temperature arose to 104°, pulse 132, respirations 28. That night he had three clonic convulsions, involving the whole body; the last one was an hour in duration. The rigidity of his head and lips soon became marked. The following afternoon the patient was hypersensitive and cried with pain when his head was moved. Shortly afterward he became somewhat delirious. Occasionally a convergent and divergent strabismus was noted. There was no history of vomiting. At this time an eruption described as red-pinhead spots appeared over the greater part of the chest, abdomen, back and thighs. There were physical signs of bronchitis. When seen the patient was quite unconscious with marked rigidity of neck, retracted pupils, definite Kernig's sign, and intense hyperesthesia. There was no question, whatever, about the diagnosis or the serious character of the ailment, and the patient was removed at once to the hospital in an ambulance. By lumbar puncture under anesthesia at the hospital, cerebrospinal fluid was found to have a pressure of more than 400 mm.; 20 c.c. of this fluid were removed and 14 c.c. of antimeningitis serum were injected. In the following seventy-five days lumbar puncture was performed five times more, and on each occasion was followed by the injection of serum. Numerous meningococci were present. In sixteen days 230 c.c. of cerebrospinal fluid were removed and 150 c.c. of serum given. Temporary improvement followed each injection, but his condition was not permanently bettered until the seventeenth day of his illness. After this time all symptoms subsided, and convalescence ending in complete recovery began.

Treatment besides the serum injection was eliminative and supporting. This case was evidently one of very severe infection, which we feel confident would have ended fatally, in short order, had it not been for the use of the serum. With this treatment, even, convalescence was long delayed, but the response to the injection of serum seemed definite.

The other instance is that of a child, aged seven years. Thirteen days before seen he came home from school complaining of headache. He went to bed, became feverish, vomited, and that evening was somewhat delirious. He had remained more or less in this condition since. The neck was stiff and his eyes were crossed for nine days. The skin was definitely hypersensitive. On examination he was found to be much emaciated, with the eruption of herpes on the lips. Tongue was coated, the head retracted, the neck markedly stiff, the chest and abdomen negative, excepting that the latter was scaphoid. Kernig's sign was present. Leukocytes were 16,400. He was at once sent to the hospital, where a lumbar puncture was done, and a cloudy fluid removed containing leukocytes and meningococci; 30 c.c. of antimeningitis serum were injected. Some improvement in his condition followed. A second puncture with serum injection was performed on the following day. The fluid removed showed a definite increase in polymorphonuclear leukocytes and a marked diminution in the number of organisms. Convalescence after this time was uninterrupted and the patient was discharged well on the thirty-fifth day of his disease, twenty days after admission. In this instance, it seems that the patient might have recovered without the serum treatment, but unquestionably the convalescence was hastened and the result made more certain because of this procedure.

During the year ending May, 1908, 21 cases of meningitis, shown by bacteriological examination of the cerebrospinal fluid to be due to the meningococcus of Weichselbaum, have been treated with the serum. Three of the 21 cases died, a mortality of 14 per cent. Of 12 cases under the age of twelve years, 1 died, a mortality of 8 per cent.

The effect *first* upon the temperature has been to cause a rapid fall. One case remained normal after a simple injection, but the majority showed a rise the next day and required at least three injections to preserve a normal temperature. As many cases have recovered by crisis as by lysis.

Secondly, with the fall in temperature, in three to twelve hours, the symptoms and signs began to clear. The symptoms, headache, delirium, pain in the neck and back, and the general hyperesthesis disappeared with remarkable rapidity. The signs, strabismus, stiffness of the neck, and the Kernig sign, were more persistent. The Kernig was often the last sign to disappear. Strangely, pressure signs and symptoms were relieved by the treatment, notwithstanding the fact that the spinal fluid removed was often replaced by the same amount of serum—in several instances by more serum.

Thirdly, the effect upon the spinal fluid itself was striking. The polymorphonuclear leukocytes were increased in the spinal fluid after the first injection, disappearing as the process healed. The cells in 1 case were increased from 200 to the c.mm. to 4,000. The influence of this upon the leukocytes in the circulating blood is quite evident. The white cells in the circulation are decreased by the increased demand for them in the spinal fluid. In every case there is a very constant, positive chemiotaxis for polymorphonuclear leukocytes in the spinal fluid.

In 6 cases of tuberculous meningitis the clear fluid with predominating small mononuclear cells became clouded with polymorphonuclears, and the small mononuclears entirely disappeared. The increase in cells was observed in a case of influenzal meningitis, but the serum caused no evident change in 2 cases of pneumococcal meningitis.

The meningococci mainly extracellular at first become intracellular after serum. Phagocytosis is promoted, so that it is difficult to find organisms outside of cells in specimens after serum.

The diplococci besides becoming intracellular are evidently being destroyed. They no longer stain deeply and distinctly, but are ill-defined and hard to see. This is evidenced by the cultures. The first specimens give an abundant growth. But after serum, the same amount of centrifugalized sediment will give from two to ten colonies, and many cultures have remained sterile after a single injection.

Although it is bold to venture to characterize the serum when Dr. Flexner himself will not do so, still, clinically, we are impressed with the rapid disappearance of signs and symptoms, which speaks for an antitoxic power. The positive chemiotaxis for polymorphonuclear leukocytes and the promoted phagocytosis are the most constant features. And finally the reduction in the number of diplococci, the change in staining properties, and the loss of viability, speak for a bactericidal power—though this may be explained by the phagocytosis.

We acknowledge with pleasure our indebtedness to Dr. L. F. Barker for allowing us to make use of the cases in his wards.

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Early Sign of Measles.—Belfadel (*Gaz. degli Ospedali*, Milan, Vol. XXVII., No. 132) calls attention to the peculiar location of the first signs of catarrhal conjunctivitis in the incipiency of measles. In 78 out of 111 patients he noted this phenomenon as the first sign of the disease. Instead of commencing as usual in the conjunctival cul-de-sac and spreading thence over the conjunctiva, the first signs of inflammation are noticed in that part of the bulbar conjunctiva which is exposed, close to the cornea. This is the point where pterygium usually develops. The measles conjunctivitis spreads in one or two days over the rest of the conjunctiva, but its appearance at this point may differentiate the disease in its earliest stages.—*Journal of American Medical Association.*

DISCUSSION OF PAPERS BY DRS. FLEXNER, CHURCHILL, DUNN AND KNOX AT THE MEETING OF THE AMERICAN PEDIATRIC SOCIETY, MAY, 1908.

Dr. Koplik.—It is often apparent, in considering the therapy of any disease, that we sometimes lose sight, in the presence of some favorable results, of the natural history of the affection, and in no disease was this more common than in cerebrospinal meningitis. As has been pointed out by Osler this disease closely resembles pneumonia in its behavior. It occurs sporadically and epidemically. In the sporadic cases we rarely meet with the severe forms. It has to be admitted that on the whole the symptomatology of the sporadic and epidemic forms is alike, but the sporadic form runs a much milder course than the epidemic form. In the sporadic form, puncture rarely reveals purulent fluid at the onset. Taking up the sporadic forms, I have been fortunate enough to have the records of cases treated since 1899 up to the epidemic years of 1904-1905. The symptomatic treatment was begun in 1899. This consisted in careful study of the symptoms and lumbar puncture repeated as often as symptoms warranted it. During 1899 and 1900 there were 8 cases of meningococcic type; during 1901 to 1903, 13 cases, thus making 21 sporadic cases. Of these, 8 patients died, a mortality of 38 per cent. Of these 8, 6 were below one year of age. There were 2 recoveries in those below one year, and 2 between the ages of one and two.

In the epidemics of 1904-1905 the history of the disease was a more violent one; some died a few hours after admission. In the first epidemic year there were 39 cases and 21 deaths, a total mortality of 53 per cent. Of these, 21 deaths 13 were below two years of age; 26 above the age of two. Of these 9 died, a mortality of 34 per cent. In 1905 there were 35 cases, of which 17 died, a total mortality of 48 per cent. Of the 17 deaths, 10 were below two years of age. The mortality was practically 100 per cent. in those under one year of age. Thus, in the two epidemic years there were 51 cases above two years of age, with a mortality of 31 per cent. There were 23 cases below two years of age, of which 78 per cent. died outright.

In the sporadic cases simple lumbar puncture saved four children below two years; in the epidemic form none were saved. I do not believe in puncture unless there is distinct indication for it. To be punctured the patient must have symptoms of pressure. The serum is introduced not by a syringe, but by a funnel, and an attempt is made to introduce the same amount of fluid that is drawn off. In my service there were 13 cases treated with the serum, the ages varying from three and one-half to eleven years; 3 were below one year. Of those below one year 1 was discharged cured at ten months. Those over two years recovered. In the children below one year that died the youngest, three and one-half months, had been ill two weeks on admission. Therefore, of 13 cases treated with serum all recovered but 2, and these 2 were below one year of age.

Dr. Holt.—Statistics were collected of 2,350 cases in the epidemic of 1904 in New York, of which the mortality, all non-serum treated, was 75 per cent. The most interesting part of the statistics was in the duration of the cases that recovered. Of 350 cases in which the duration of the disease was known, 50 per cent. lasted five weeks or longer. This is very striking in comparison with the cases reported to-day. During epidemic years we treated 83 and lost every case under one year of age, regardless of the type of the disease, frequency of lumbar puncture, or anything else. Unfortunately, there have been so few cases during the last year in New York that I have not seen many. I have seen 1 case of five months get well. It seems to me the showing here to-day is very encouraging.

Dr. Rotch.—I have had a very good opportunity for watching these cases, and would merely say I am very loath to speak of epidemic cases and sporadic cases; the special organism declares the disease. It may differ in type, but not in any essential way.

We have shown in our wards that these injections do no harm. In various successive years, trying all courses of treatment, antitoxins, vaccines and lumbar puncture, we have come to the conclusion that it is absolutely safe to give the injections, and, I think that is a very important point, because so much is said at times about it not being right to give them. We haven't time to wait; it is too serious a disease. We know what happens when we wait and when we do not take the cases early and give the injections. It seems to me absurd not to give the treatment at once, since we know that it does no harm.

In regard to the treatment with lumbar puncture, it certainly did at times do good temporarily—just as benefit would be had in relieving any pressure. Where there is an overwhelming number of organisms, drawing off a considerable amount of the fluid lessens the number of invaders, but that does not mean that there are not a large number still remaining which can get in their damaging work.

In the case of vaccines, we found that although not curative in any way, they did help in raising the opsonic index, but that is not of so much moment in the light of our recent views on the opsonic index. Something may be done with the vaccines, but not as much as with the serum.

Clinically, there is no doubt that we should repeat the dose. I believe that we may at times save life by injecting twice in the twenty-four hours. It seems to me that the consensus of this society should be to push the treatment. We may in this way, perhaps, arrest many of the sequelæ. We may be able to avoid these very distressing sequelæ which follow the fulminating cases. I am not afraid to give it and give it frequently. The youngest case I have seen was twenty-four hours old and died on the second day.

Dr. Jacobi.—I have no active service and so I have no experience with the serum treatment of this disease. I know only what I have heard this morning and have read before.

One remark made this morning was that wherever there is a subnormal temperature there was a fatality. The question arises, can anything be done in those cases? Whenever we find a subnormal temperature in other septic diseases it is the result of a complication. It is so in diphtheria for instance. We expect an active case of diphtheria with subnormal temperature to die. These are the cases in which antitoxin is of no use no matter in what stage of the disease. In these cases there is a complication; a streptococcic infection for instance at the same time, and the question arises, Are not these cases with subnormal temperature due to a complication that we do not as yet understand, and could there not be a treatment besides the serum treatment in these cases to correct the complication? We know that a number of bad cases of diphtheria which are not benefited by antitoxin are still benefited by alcohol, which many of us have used for a number of years and a number of decades. A number of such cases will get well under attempted intoxication for these babies. The intoxication cannot be accomplished, but should be attempted. Give as large doses as will go down. Perhaps these cases of meningitis need to be treated with something else in conjunction with the serum; they may need to be stimulated.

I am delighted at what I have heard this morning, and sorry that I cannot contribute something more to the discussion along this line.

Dr. Morse.—My experience in the use of the serum has not been as great as that of some of the speakers, but I have seen a good deal of meningitis during the last ten years and have had some experience with the serum, especially in babies.

Knowing as we do how unreliable clinical observation is, it is conceivable that we may be mistaken in attributing the apparently good results to the serum, but we cannot be mistaken in what we see in the examination of the spinal fluid. When we see the organisms both within and without the cells and get a culture one day, and the next day, after giving the serum, find no organisms outside of the cells and a much smaller number in the cells and no growth on culture media, and the next day no organisms and negative cultures, we cannot doubt that the diminution and disappearance of the organisms are due to the serum.

It seems to me that the indication for lumbar puncture is the suspicion that the case may be meningitis. When there is any suspicion of meningitis it is our duty to do a puncture in order to find out. The indication for the use of serum is the presence of the meningococcus. If we get a turbid fluid we should, however, give the serum at once without waiting to determine whether or not the meningococcus is present, because if it is present much has been gained by giving the serum early, while if it is absent no harm is done.

It has been stated that the serum should not be given unless there are signs of increased cerebral pressure. It seems to me that this position is wrong and that it is the presence of the meningococcus, and not the presence or absence of increased cerebral pressure, which is the indication for the use of the serum. It has also been stated that we should put in the same amount of serum as of the fluid taken out. This does not seem rational, as, if there is increased pressure, the amount of fluid is abnormal and there is no reason for increasing the pressure again. The serum is given to kill the organisms and not to affect the pressure. In fact, in many cases the fontanel is depressed and yet the fluid is purulent and contains cocci. The serum should certainly be given in such cases. A dry tap, moreover, is not a contraindication for the giving of serum. I have recently had a case where a very thick fluid that would hardly run through the needle was obtained at the first puncture. This fluid showed the meningococcus, and the baby needed the serum. The punctures on the two following days were dry. The baby, nevertheless, needed the serum and got it. I agree heartily with Dr. Churchill that a turbid fluid is an indication for the use of the serum, and that the serum should be given early and often; certainly every day; sometimes oftener than once a day.

Dr. Freeman.—It seems to me that one point brought out today should be emphasized, and that is that the serum may be valuable in very late cases. In Dr. Churchill's cases there are two in which in a very late stage the serum was followed by prompt reaction.

Dr. W. W. Wilkinson (Guest), Washington.—In 10 cases treated in Washington at the Garfield Hospital, we had 7 recoveries and 3 deaths. Of the 3 cases that died, 1 had chronic hydrocephalus on admission and confirmed by autopsy. Of the other 2 cases, 1, I think, would possibly have recovered if larger amounts of the serum had been used in the beginning. 15 c.c. of serum were given at first; there was clinical improvement, and the serum was not repeated at that time. The organism reappeared in the fluid, however, and the patient died, despite repeated injections of the serum afterwards. Autopsy showed evidences of toxemia. The other case that died was a very severe one, and was in a comatose condition when the treatment was begun.

There was considerable improvement in the meningeal symptoms and the spinal fluid following the administration of the serum, but he developed an intestinal paralysis and nothing could be done to save him.

In our cases we have had the best results with one injection of 15 c.c. or two of 30 c.c. on successive days. Four cases recovered with one injection only of 15 c.c. The earliest day we have gotten the cases has been the fourth. The duration of the cases following the injections has been about fourteen days, but in most of them there was a cessation of the bad symptoms in four or five days. In the studies we have made we invariably found the organisms rapidly disappearing from the fluid and the leukocytes diminished. We have also found an increase in phagocytosis; in some cases a very marked increase. The organism usually failed to grow and stained poorly, following the serum injections. One of the fatal cases was a mixed infection with the influenza bacillus.

Three cases recovered with sequelæ; 1 lost the right eye, 1 recovered with deafness and 1 with impaired mentality.

Dr. Adams.—I want to draw attention to the fact that while clinical observation may not be of much consequence, at the same time the results of clinical observation are of great importance. It has been shown here today that by the administration of this treatment we avoid those sequelæ, which are in many instances worse than death. In the observation of years we have learned that in institutions and in private practice a certain percentage die, and that of that percentage which is supposed to recover, many are not a complete recovery; they are deaf, blind or suffer from palsy or impaired mentality, and often it would have been better if they had died rather than to have been left as a burden on the community. From the results presented here today it would certainly seem that we may avoid a number of these misfortunes which have occurred under the other methods of treatment. Of course, with others, in following the previous methods of treatment, I have had a high mortality, corresponding to that given in the reports, and of those supposed to have recovered I have had a fair proportion of cases of deficient mentality and other sequelæ of the disease.

With the serum treatment my experience has been almost too limited to speak of, except that I had one child of seven months with pressure so great that it burst through the fontanel, and that child with one injection of the serum improved most markedly in twenty-four hours.

In another boy, thirteen years of age, the symptoms were most intense, with convulsions and opisthotonos, and the boy recovered. The stiffness of the neck persisted for a couple of weeks, but he was perfectly conscious and intelligent.

Now there may be "doubting Thomases," but there has been proof enough here today to encourage us to go on with this treatment, which certainly offers much better results than any other method of treatment we have had in the past three decades.

DR. KERLEY.—I am sure you will all agree with me that this has probably been the most interesting session in the history of this Society. We have had brought before us here today a method for the treatment, alleviation and cure, largely the cure, of a disease that we have heretofore looked upon with little or no hope so far as medical means were concerned. I only hope that the good results that have been reported will be continued.

DR. KNOX.—I would like to add that in Baltimore the knowledge of the clinical value of the serum has attracted to the hospital for the spine very many more cases than we have formerly had. I think that should be generally emphasized. The health statistics in Baltimore show that there have been no more cases than usual; no epidemic.

DR. DUNN.—I just want to say one or two words in explanation. I was interested in hearing Dr. Knox say the serum gave a good deal of pain. I saw that in 2 cases; the patients complained of severe pain in the back of the legs and knees, but most of them did not make this complaint. I found that in these 2 cases I had failed to warm the serum. I do not know whether that had anything to do with it or not, but the majority of my cases did not complain of pain.

In regard to Dr. Jacobi's remarks I did not mean to say that all cases with subnormal temperature died; in fact, 1 case recovered after seven weeks' illness who had subnormal temperature. I meant that all cases that had passed over the period of active fever and symptoms frequently go into a state of unconsciousness with subnormal temperature, and that that was the type of case that was unfavorable.

I would say, too, that so far as our cases in the last ten years are concerned, we have not been able to observe any difference in type in the so-called epidemic years.

DR. KOPLIK.—I would say only one word more. I still believe that we should never puncture except on indication, and that we do not want *only* to diminish pressure by puncture, but we wish also to affect the meningococci. In these cases I have observed that if you introduce 30 c.c. after having withdrawn that amount, the next day, the indication of the amount of fluid in the ventricle is less than the preceding day. For that reason, the child doing well, I think it superfluous therapy to puncture daily unless the symptoms warrant it.

DR. SIMON FLEXNER, New York (closing discussion).—I recognize the criticism Dr. Koplik makes, that meningitis is a very variable disease; it may not only vary in different seasons, but in different localities. It has not been possible in every instance to get comparative statistics; that is, cases occurring at the same time and of the same age, where nothing, or only lumbar puncture has been done and then those in which the serum has been used systematically.

The largest and the best statistics I have gotten from Belfast, and this is fortunate, because it has been for a year past passing through an epidemic. During the height of the epidemic a mortality of 75 per cent. was reported. I cannot say whether lumbar puncture was used only for diagnostic purposes or also as a therapeutic measure. Dr. Robb has secured for me a record of cases treated outside of the fever hospitals during the same period as those treated with serum in the hospitals. The mortality had been 80 per cent. at a time when it was only 26 per cent. in the hospitals. Of course, the cases outside were probably not treated so well as those in the hospitals. There is also this difference to consider, that the cases outside may have included a greater number of fulminating examples, but the difference between 80 per cent. and 26 per cent. is so great that something else than this must be invoked to explain it. Akron, O., passed through a small epidemic the year after the New York one. There were 26 cases there and in the surrounding locality considerably more. Two sets of figures are to be considered here—12 cases treated with the serum with 3 deaths and 9 recoveries, and 9 cases treated without the serum with 8 deaths and 1 recovery.

I only state these points for what they are worth. I do not wish to be put in the position of making out an overstrong case for the serum, though I believe in it.

As to the manner of production of the serum, the serum belongs to the class of bacteriolytic sera, in which we are obliged to use the entire constituents of the organisms in its preparation. We know now at least three antitoxic bacterial sera—of diphtheria, tetanus and dysentery. They are the most useful; we all know what they accomplish. You can give an animal any amount of tetanus toxin you please, and if you give a corresponding amount of antitoxin the animal will be saved. The same thing appears to be true of the dysenteric serum. If you multiply the toxic and antitoxic sera equally you secure neutralization. This is not true of the antimeningitis serum. In making the serum the organisms are subjected to unfavorable conditions, when they undergo autolysis and yield an extracellular toxin. With that preparation the process of immunization of horses is begun. It takes many months to accustom the horses to a considerable dose. After this the living organisms are employed to secure the full value of the microorganisms' immunization.

Now when you test the serum on animals, it is found that it does not produce neutralization of the toxin according to the law of multiples, as is the case in the diphtheric and tetanic sera.

The guinea pig can be protected up to a certain amount, but a point is quickly reached beyond which multiples of the serum do not neutralize.

In employing a serum of this class it should be borne in mind that the results depend, to a considerable degree, on the concentration. The antibody should be present in a certain state of concentration. When it is diluted too much by the blood and lymph it is powerless to produce the most favorable results.

I believe that the success which has been achieved by this serum has been in virtue of the fact that you bring a bacteriolytic and somewhat antitoxic substance in contact with the focus of the disease. I think this the secret of the matter so far as efficiency goes. Given into the circulation the secretion into the subdural space is slow and imperfect. The thing to be emphasized is that you require this fluid in a certain high state of concentration, and hence injections made directly into the spinal membranes is the obvious way of accomplishing this desideratum.

There is a larger question involved in this study, which is that it is an indication of the value of local application of antisera. If a means could be found of treating pneumonia by some such method as this it would be one of the things by all means to be tried. To return to meningitis. In employing the antiserum, your problem is not to neutralize a poison that is already attached to the viscera. The poison of the diplococcus is not a general, systemic one, but a local one, chiefly acting on the nervous system. Hence the endeavor to bring the agent directly in contact with the focus of the disease, which idea involves, I believe, a slight departure from the general notion of the manner in which infectious processes are influenced by curative sera. The reason we have failed with sera in certain diseases is perhaps because we have tried to reach the local processes through the general circulation. Now in meningitis the general viscera show few evidences of injury at autopsy, thus supporting the notion that the systemic effects of the poison are inconspicuous.

WINTER DIARRHEA IN INFANTS.—Shelmerdine (*New York Medical Journal,* March 14, 1908) points to the existence of a winter diarrhea of children strongly resembling the summer diarrhea, and relates a case in his own household. He found the diarrhea to result from the freezing of milk, which spoils it, and causes curds to form on thawing. After straining the milk the diarrhea disappeared. The diarrhea of frozen milk is not so severe or debilitating as that of the summer season. If need be, the child can be taken off the milk diet for twenty-four hours and given barley water in the interim.—*Medical Record.*

THE LENGTH OF THE INTERVAL BETWEEN FEEDINGS.*

BY C. G. GRULEE, A.M., M.D.,

Associate in Pediatrics, Northwestern University Medical School; Attending Pediatrician to Provident Hospital, Chicago.

In the past few years there has been a tendency on the part of the pediatric profession in this country to question some of the supposedly established rules of infant feeding. This tendency has been promoted by a closer inspection of the ideas of foreign writers, especially German, and from the various publications on the subject, would seem to have gained a stronger foothold in the west than in the east. The ideas advanced by these German scientists are based upon wide clinical experience and definite scientific facts and cannot be set aside by mere theoretical reasoning. It appeals to the writer that instead of involving our fellow physicians and the laity in a maze of mathematical computation in an effort to properly feed an infant, we should attempt to simplify our ideas as far as feasible in order, if possible, to eliminate some of the complicated features. With this object in view, a study of the number of feedings necessary to the child in twenty-four hours is of interest.

We will find, by looking over the literature, a great divergence of opinion on this subject. Holt, following the so-called percentage method of feedings, advises that during the first month the child be fed every two hours during the day and twice at night, or ten feedings in twenty-four hours. He gradually increases the interval until, beginning with the eleventh month, it is four hours during the day and once at night. This agrees in the main with the opinions expressed in most American textbooks. Although not following the same method of preparation of food, Budin likewise is of the same general opinion in regard to the interval between feedings. It might be stated that in reading Budin's book one gets the impression that his work has been largely on breast-fed, and usually very young, infants.

If now we turn to the German writers we will find a very different opinion. Heubner, Finkelstein, Czerny and Keller, all state that an artificially nourished child should be fed from birth on at intervals of four hours during the day and once at night. Czerny and Keller are of the opinion that breast-fed children should follow the same rule, while Heubner advises giving the breast every two hours at first, very soon lengthening the interval so that the child nurses but seven times in twenty-four hours and after the fourth month no oftener than six, and even as few as five, times.

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* **Read before the Chicago Pediatric Society, May 12, 1908.**

Should it be possible to lengthen the interval between feedings, as Czerny and Keller suggest, and at the same time retain the good health of the child, a distinct advance in the simplification of infant-feeding will have been made. This arrangement will allow the mother or nurse more time for her other duties and pleasures and train a child to longer periods of rest between feedings, which, I think, will be granted by all to be of distinct advantage.

In order to properly nourish a child under these conditions, it is necessary either that the amount in the single feeding be greater or that the food be more concentrated, or both.

Leaving out of the question the composition of the food, we would expect with such long intervals either that should the food be of sufficient caloric value the amount of the individual feeding will be so great as to cause distention of the stomach with regurgitation, or that the single feeding being small enough the amount obtained in twenty-four hours would be too little to cause a consistent gain in weight. As to what characterizes a sufficient gain in weight we may have different opinions, so that it might be well to state the writer's standard. He feels that a steady gain of four ounces a week is sufficient to insure the health and strength of the child, and that any gain over 6 ounces, except in exceptional cases, should lead one to inspect carefully the food, so as to be sure that the child is not being over-fed.

However, if we can obviate the above-mentioned difficulties, we not only are in a position for saving time and trouble to the attendants of the child, but have gone far toward preventing one of the chief sources of infantile morbidity, over-feeding.

The scientific reason advanced by Czerny and Keller for their position is based upon the experiments of Hamburger and Langermann. Hamburger proved that combined HCl possessed almost no antiseptic properties, and these reagent glass experiments were confirmed by Langermann's examination of the bacteria contained in the stomach contents in nurslings.

Since free HCl appears in the stomach of the breast-fed infant at earliest only one and one-quarter hours after nursing, and in that of the artificially-nourished at earliest only two hours after, Czerny and Keller advise the long interval, in order that the free HCl will have time to exert its bactericidal action.

Against the theory that by giving comparatively large quantities at a feeding, the stomach will become distended, Heubner advances the view that "during nursing a part of the ingested food passes from the stomach into the intestine."

The question here involved is a different one in respect to artificially-nourished children from that of the breast-nourished, since the latter involves the amount of stimulation necessary to the breast to produce a sufficient supply of milk. The writer's experience with breast-fed infants is small, and hence a positive opinion is impossible, but from what cases he has seen he believes that it is often of distinct advantage to the child to lengthen the interval between nursings to four hours, and he is inclined to believe that most breast-fed children can be so nourished after at latest the third month. As to younger infants, he has no right to an opinion.

In artificially-nourished children we can control the concentration of the food, and the amount at each feeding, and hence are prepared to see that the child obtains the proper amount of food. Of artificially-nourished children the writer has prescribed the feeding of 30 cases since the first of last December. Of these cases 17 were from three days to six months of age when first seen. Of the remaining 13, 9 were under one year and of the 4 over one year 1 was a hydrocephalic infant, which weighed between 10 and 11 pounds during its stay in the hospital. With one exception, the writer has fed every child at intervals of every four hours during the day, and in the younger children has prescribed one feeding during the night. In no one of these cases has he been able to ascribe a symptom to distention of the stomach nor to a deficient quantity of food.

The one case in which the writer felt it would be an injustice to the child to attempt to feed it at four hour intervals was a three weeks' premature syphilitic child, which was brought to the writer at the age of two weeks, weighing 4 pounds, 12½ ounces. After vainly attempting mixed feeding it was found necessary to put the child on four bottles of artificial food and three bottles of human milk in amounts of 2 and 2½ ounces respectively, on which feeding it gained nicely.

At the Infant's Diet Kitchen of the Northwestern University Medical School, the practice of ordering four hour intervals between feedings has been carried out by those connected with the Pediatric Department for almost a year, and at present there seems to be no tendency to revert to our former ideas.

The writer believes that the four-hour interval between feedings for infants possesses the following advantages:—

(1) It enables the stomach to have a period of rest between feedings.

(2) It makes possible an antiseptic action by the free HCl of the gastric juice.

(3) It trains the child to longer periods of rest between feedings.

(4) It is a strong factor in preventing over-feeding.

(5) It acts in a striking manner in overcoming certain cases of vomiting caused probably by the failure of the stomach to obtain rest under previous conditions.

It is also safe to conclude that the necessary increase in the amount of each feeding does not cause a distention of the stomach, and that such a method of feeding is perfectly compatible with a consistent gain in weight. If we add to these advantages the practical one that the mother or nurse is put to less trouble, it would seem that a lengthened interval between feeding would at least deserve more wide attention and consistent trial.

PARATYPHOID MENINGITIS IN INFANTS.—Arzt and Boese (*Wien. Klin. Woch.,* Vol. XXI., No. 7) relate experiences and research which establish, they think, that paratyphoid infection is by no means uncommon among infants. It probably originates in the intestinal tract and may lead to bacteriemia. A fibrous-suppurative meningitis may follow, and this form of meningitis may prove to be more frequent than hitherto supposed. The article concludes with a bibliography of 144 articles bearing on paratyphoid infection and meningitis.—*Journal of the American Medical Association.*

ARCHIVES OF PEDIATRICS.

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WHOOPING-COUGH HOSPITALS—A NEED OF EVERY LARGE CITY.

Every physician of large experience with babies and young children must have been confronted many times, both in his hospital and private practice, with cases of pertussis that needed the constant nursing and medical supervision of a good hospital.

In infants pertussis alone is sufficiently formidable; but when to it are added any one of its complications the case becomes indeed serious. Statistics from New York City for the year 1905 show that the deaths from whooping-cough of children under five years amounted to 397. This is more than died at those ages that year from scarlet fever, typhoid and malaria combined of children. Moreover, taking the ten years from 1895 to 1904, the deaths at all ages from whooping-cough were 3,200. During the same period the total deaths from typhoid fever were

3,430, from scarlet fever 4,809, and from measles 4,804. It is seen, then, that whooping-cough during the ten year period was almost as fatal as typhoid, and two-thirds as fatal as either measles or scarlet fever. Bronchopneumonia, colitis and cerebral hemorrhage make up a group of very dangerous secondary maladies to be borne by a baby already depleted by the vomiting, inanition and muscular strain of the primary disease.

Very often cases of bronchopneumonia just about to be sent to the wards are found to be suffering from a whooping-cough complication; then they are refused and sent back to their homes, where perhaps they infect a still younger child who would not have taken the disease at that age had it been possible to isolate the patient and give him hospital treatment. Or a patient may develop pertussis in the hospital in the course of an enterocolitis; such a child ought not to be sent to his home. Again, in the dispensary, the same need arises—a mother with several children brings the largest one (just starting to school) to the dispensary for a persistent cough. The paroxysms and absence of temperature, together with the confirmatory small lymphocytosis in the blood make certain the diagnosis of whooping-cough. A hospital is evidently the place for that child, if the younger ones, in whom the disease is much more fatal, are to have the best chance.

No hospital in New York City will knowingly receive cases of whooping-cough. This is a crying shame. But New York is not unique among American cities in this respect. So that with all our boasted advance we are far behind France and Germany in this respect. There should be in every borough of the city a small hospital for these cases. The project is worthy of agitation in every large American city.

TETANY IN CHILDREN.—Pineles (*Jahrb. für Kinderhk.*, Berlin, Vol. XLVI., No. 6) affirms that evidence is constantly accumulating to sustain the assumption that tetany in children is due to insufficiency of the parathyroids.—*Journal of the American Medical Association.*

FEVER PUZZLES IN CHILDREN.

On account of rapid tissue change and of the undeveloped state of the nervous system of young children, their temperature is subject to rapid elevation from slight causes. Of course it is usually possible to discover by physical examination the reason for a rise in temperature. For instance, a common cause of fever in young children is a simple cold in the head, which may be accompanied by a fever of 103° or over.

In a recent address published in *The Lancet* of September 12, 1908, Dr. Edmund Cautley, of London, emphasizes the conditions that give rise to anomalous pyrexia in children. His presentation of the subject is so complete that it is worthy of being brought to the notice of all readers of the ARCHIVES OF PEDIATRICS.

The cases are divided by Dr. Cautley into three groups: (1) Those in which nothing is found on physical examination, but the probable diagnosis can be made from the history; (2) those in which a careful physical examination reveals an unexpected cause, and (3) those which are due to undiscoverable causes. In the first group are placed those cases in which the rise of temperature is due to the application of external heat, as by hot packs or bottles, or by too much clothing, especially when the patient already has fever. This we have all frequently seen as a result of overzeal in maintaining the heat of premature babies. Next there are those that are due to toxins acting on the heat centers or to excessive muscular action. Here also are found those that are apparently reflex, the result of excitement, fright or the passage of a catheter. In the next group are mentioned all temperatures due to obscure causes discoverable on careful physical examination, especially in newborn and nursing infants, such as from slight sepsis, inanition, menstruation by the mother, change in the mother's diet, maternal emotion, overexcitement of the child and teething. To this list of Dr. Cautley may be added: intestinal indigestion from overfeeding, stomatitis, gingivitis, cervical adenitis and otitis.

For over thirty years Dr. Jacobi has been insisting upon the necessity of examining the drum membrane of all infants that are suffering from unexplained fever. It cannot be reiterated too often that inflammation of the middle ear, particularly if the baby is suffering at the same time from a head cold, will solve a great many of the temperatures in young children.

In Dr. Cautley's list are also the following: Inflammations of the throat and nose, glandular fever, chronic pitted tonsils, intestinal infections and toxemia, or the presence of indigestible food in the alimentary tract, the oncoming of any of the infectious diseases (especially grippe), rheumatism, pyelitis and, finally, neurotic excitability of the child.

In the third class are mentioned cases of fever that extend over weeks or months or that come most frequently during the period of puberty in girls; also as a sequel to typhoid and as a result of epileptic attacks.

If it is realized as fundamental that slight causes can give rise to marked temperature elevations in infants and if a careful physical examination is made along the lines suggested by the causes enumerated, there will be very few cases that will fall into Dr. Cautley's third class. Generally it is failure to take the time to make a complete examination that results in failure of diagnosis. The young child is so easily examined all over that even the busiest physician can learn to do it and thereby to gain increased satisfaction from practice among his little patients who cannot yet describe for him the location of their troubles.

THE KIDNEYS IN ALIMENTARY INTOXICATION.—Neumann (*Jahrb. für Kinderhk.*, Berlin, Vol. LXVI., No. 6) analyzes a number of cases, stating that albumin and tube casts in the urine were found constantly in his cases, but that they testified merely to irritation of the kidneys. No pathologic anatomic changes in the organs could be detected. The signs of transient irritation paralleled the general symptoms of the alimentary intoxication and yielded with them to dietetic measures. Both the kidney irritation and the other symptoms were evidently the work of the alimentary toxins. Uremic symptoms are never modified by a change of diet.—*Journal of the American Medical Association.*

Society Reports.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Held June 9, 1908.

J. P. Crozer Griffith, M.D., President.

SEQUELÆ TO EPIDEMIC CEREBROSPINAL MENINGITIS.

Dr. Howard Childs Carpenter showed a case of contractures following epidemic cerebrospinal meningitis in a boy of eight years. The child had had a virulent attack of meningitis, during which he became blind, deaf and partly paralyzed. Hearing and sight returned to normal, but the paralysis was followed by contractures of the left arm and both lower extremities, which persisted fourteen months after the onset of the meningitis.

Dr. B. Franklin Royer showed a boy of three years who entered the Municipal Hospital when twenty months old, with typical epidemic cerebrospinal meningitis.

Temperature remained hectic for three weeks. Internal strabismus was noted on the seventh day, conjunctivitis of the left eye, with a purulent discharge on the fourteenth day, with some improvement by the sixteenth day. Blindness of the left eye was first noted on the 22d day, with a greenish yellow background on looking into the pupil. At the time of discharge, the left eye was blind, a curious yellowish spot being visible apparently on the posterior surface of the lens.

Ten months later he was found to be a well developed, healthy child, whom his mother considers brighter than were her other children at the same age; but he was entirely blind in the left eye, the globe of this eye having atrophied until it was less than two-thirds the size of its fellow. The conjunctiva was much reddened and injected. All reflexes were normal and the child's gait was steady.

Dr. Royer added that the case shown by Dr. Carpenter had lumbar puncture performed eight times in the course of the disease, once at the Episcopal Hospital, to confirm the diagnosis, and seven times in the Municipal Hospital. It was of considerable interest to note that, in this case, in which excessive amounts of fluid had always been withdrawn, McEwen's sign, a tympanitic note over the pterium, was always present and was present today; and that, after puncture, this note became less tympanitic. When he came to the Municipal Hospital the cerebrospinal fluid was cloudy, with meningococci, both intracellular and cellular; 96 per cent. polymorphonuclears and 4 per cent. lymphocytes, while the blood estimation was 31,600 leukocytes to the cubic mm.

Dr. Carpenter said that, while McEwen's sign had been most marked on the left side when the case first came under observation, it was most marked now on the right side. All treatment up to the present had been without appreciable result. He thought surgical intervention might become necessary to overcome the contractures.

CONGENITAL ABSENCE OF THE FOURTH COSTAL CARTILAGE AND NIPPLE ON THE LEFT SIDE.

Dr. J. K. Walker showed an infant aged one year, the first child of healthy parents. Labor was normal. Immediately after birth it was noticed that there was a depression over the anterior portion of the chest on the left side of the sternum. At time of presentation the right side of the chest was well formed. On the left side was a depression measuring about 1½ x 1½ inches. The fourth costal cartilage was absent and the third costal cartilage had a common insertion with the second. The left nipple was totally absent.

MILIARY TUBERCULOSIS IN CHILDREN.

Dr. C. N. Sturtevant, by invitation, showed specimens from 4 cases of miliary tuberculosis from St. Christopher's Hospital for Children. The children had been under the care of Drs. Fife, Judson and Tully during the previous eight months. All were little girls, aged two, six, twenty months and six years respectively. All showed general involvement at autopsy, lungs, liver, spleen, peritoneum, mesenteric and bronchial lymph nodes in each case being studded with tubercles. The 2 cases which before death had had convulsions on one side of the body showed at autopsy tubercles in the region of the fissure of Sylvius upon the opposite side.

Both cases before death were characterized by marked bulging of the fontanels; this decreased after repeated lumbar punctures, which were also followed by marked relief to the patient, the infants always breathing easier after the excess of cerebrospinal fluid had been withdrawn. They took nourishment better, too, and for a while, at least, muscular twitchings ceased.

Two cases showed tubercles on the pericardium covering the heart, specimens which were thought to be of special interest, because of the comparative rarity of such involvement and of the large size of one of the tubercles. The little girl of six years had had enlarged cervical lymph nodes on the left side for three months before admission. She was not sick, but as the enlarged lymph nodes did not diminish, her mother requested that they be removed by operation. Immediately after operation the child became very ill, general involvement having evidently been precipitated, ending in death four weeks later.

Dr. J. P. Crozer Griffith said that, as far as his experience in autopsies extended, miliary tubercles upon the heart were decidedly uncommon; and this was, he believed, the general opinion. He said, too, that in all cases where fluid was suspected in the spinal cord, lumbar puncture was strongly to be advised. It was true that no permanent good could be expected in cases of tuberculous meningitis, but that temporary relief might be claimed.

FATAL VOMITING.

Dr. Eleanor C. Jones reported 2 cases of fatal vomiting. The first occurred in 1903, in a child of thirty-four months, with neurotic and rheumatic history. The attack was characterized by nausea, persistent vomiting, great prostration and constipation. There was some epigastric pain at the beginning, but no abdominal tenderness or distension. The urine did not contain albumen or casts; no examination was made for acetone. The child died of exhaustion on the eighth day of the attack. No autopsy was permitted.

The second case was a boy of three years, with a neurotic history. The attack at first resembled tuberculous meningitis, but meningeal symptoms subsided in three days. Clinical symptoms were the same as the first case. Postmortem examination showed the liver larger than normal, with advanced fatty change, the liver cells nearly indistinguishable, and marked round cell infiltration. No nephritis was present. The blood vessels of the kidneys were dilated with a great deposit of pigment in the kidney structure. Thymus and mesenteric lymph nodes were enlarged, also the glands about the gall ducts. These, however, showed nothing abnormal on microscopic examination. The changes in the liver showed marked functional incompetency of that organ, which is at least one of the causes of the resulting toxemia, leading to the general irritation of the nervous system noted in these cases.

DR. JOHN H. JOPSON said that he had once operated on a case of supposed obstruction in an infant, which may have belonged to this type of cases.

DR. J. C. GITTINGS said that in the solution of the problem of recurrent vomiting, the researches in physiological chemistry, which were being carried out so extensively, would probably be the determining factors.

DR. GRIFFITH said that the element of nervous influence seemed unquestionable in some of these cases, but probably in all cases the chief etiological factor was some fault in metabolism. It is commonly believed that the condition was the result of an acidosis, and on this theory we might expect benefit from the administration of large doses of the alkalies. In the matter of diagnosis, Dr. Griffith drew particular attention to the difficulty of distinguishing some cases of recurrent vomiting from intestinal obstruction. The two were often extremely similar.

FOREIGN BODY COMPLICATING TUBERCULOUS ENTERITIS.

DR. J. CLAXTON GITTINGS reported this case, a girl of five years, with tuberculous enteritis, in whom the routine X-ray examination of the abdomen for tuberculous lymph nodes revealed a round foreign body near the anterior superior spine of the right ilium. This was thought to be a possible cause for the severe pain in that region and tenesmus, of which the child had complained. At the operation Dr. H. C. Deaver found a button in the lower ileum, freely movable, which was prevented from escaping by a stricture of large calibre, produced by the partial healing of a tuberculous ulcer. The ileum was literally studded with lesions, both recent and old. The operation resulted in almost entire relief from abdominal pain and in a marked reduction in the number of stools, but, as was to be expected, had no effect upon the ultimate outcome, death resulting four months later.

DIPHTHERIA IN AN INFANT TWO WEEKS OF AGE.

Dr. Royer said that diphtheria in infancy is not very uncommon. In his case the source of contagion was definitely known. The child was a colored baby two weeks old, who entered the Municipal Hospital April 30, 1905, having become ill the day previous, when only thirteen days old. He had slept with his two-year-old sister, who had been taken ill three days before and came to the hospital with the baby with a severe attack of diphtheria. After a typical course both children were discharged in good condition seventeen days after admission.

Scarlet Fever.—Barlow (*Practitioner,* December, 1907), from an analysis of 832 cases, concludes that the presence or absence of complications does not depend entirely on the severity of the scarlet fever attack, but depends in an equal degree on the patient's condition when attacked and in a less degree on the age, complications being more likely the younger the child. A fever hospital is not the place for very mild cases if there is the slightest chance for isolating the patients at home for a few days. In his opinion, the very mild cases are infectious only for a few days. The diagnosis of scarlet fever is by no means always simple. Too much attention is often fixed on the rash, which may last only a few hours and may mislead by its atypical characters. Mild cases require no treatment beyond abundance of fresh air and a mild disinfecting throat spray. For otorrhea he recommends irrigation with boric acid solution and filling the ear with the acid. When the flow of urine is well established he prescribes iron. The duration of the infective period varies from a few days to some months. The nose and the nasopharynx he considers the sites where the infection lingers. Children with adenoids and large tonsils are apt to remain infectious for some time.—*Journal of the American Medical Association.*

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, May 12, 1908.

J. W. VanDerslice, M.D., President.

Dr. I. A. Abt presented a case of splenic leukemia in a boy ten years of age, who was treated for six weeks with X-ray and Fowler's solution. Blood examination showed 50 per cent. hemoglobin, 3,100,000 red corpuscles, and 28,200 white.

Differential count:

Eosinophilic myelocytes	1
Neutrophilic myelocytes	39
Polymorphonuclears	50
Large lymphocytes	3
Small lymphocytes	4
Eosinophiles	3

There was one nucleated red among two hundred white cells.

At a later time the hemoglobin was 70 per cent., the whites 193,000 and the reds 2,400,000, whereas previously there had been the numbers above given. The boy was somewhat anemic. The heart action was rapid. The apex beat was in the fourth space and a little outside the median line. The immense size of the spleen was easily seen and the immense splenic tumor extended nine inches below the ensiform.

The patient had had no appreciable glandular enlargement.

Dr. E. L. Lackner commented on the improved condition of Dr. Abt's patient, which he considered could only be temporary. The prognosis, of course, was dubious.

Dr. Abt said that so far as the treatment or prognosis was concerned, he believed everybody was agreed that the prognosis was absolutely bad under any plan of treatment. Some statistics he has noted show that in three and one-half, or four years at the very outside, they make their exit.

Dr. George Allen Staples, of Dubuque, Ia., read a paper on

THE TREATMENT OF SPASTIC DIPLEGIA WITH IDIOCY.

Dr. Staples believed that a large portion of these sad cases could be improved by operative and post-operative treatment, so that otherwise useless members of the community could be made useful. He advised tenotomy for spastic tendons and prolonged extension to overcome contractures. These measures should be followed by educational methods combined with massage. The educational method alone, however, would often accomplish a great deal and might avoid operative interference. The amount of improvement which was possible by this method depended upon the amount of brain tissue which was left uninjured. Dr. Staples detailed the method of educating the child to use his limbs and reported a case of his own who made remarkable progress under the educational method of treatment.

Dr. Abt thought that many cases of diplegia could have been benefited if the proper exercise had been employed. He also thought many times certain forms of treatment were neglected because it was so difficult to get the right kind of people to give the treatment.

Dr. Lackner said that he had had a case of lack of spinal development which had improved greatly under such treatment at the hands of Dr. Müller, Dr. Lorenz's assistant.

Dr. M. P. Hatfield said he imagined parents who were interested could be taught to apply this sort of treatment, and he felt this line of thought is just what is needed.

Dr. S. J. Walker said there is no question but all of these cases of diplegia and hemiplegia could be benefited by a system of physical-mental exercises, but each individual case depended upon the amount of mental exercise possible. In the poor homes, where the cases occurred just as frequently as they did among the better class of homes, nothing of the sort that was outlined by Dr. Staples can be successfully carried out. So, whenever he gets a case, he does his best to induce the parents to place such a child in an institution.

Dr. A. C. Cotton believed that they have abandoned as hopeless too many cases of diplegia patients with imbecility or only slight mental impairment. Every year instances are accumulating showing the value of patient persistence in the development of these children.

Dr. Cotton agreed with Dr. Walker that much more can be done in institutions than in the home of moderate means. He wished there were more institutions.

Dr. J. H. Hess referred to visiting an institution at Grätz for the treatment of these children. There a complete outfit of apparatus for orthopedic work was installed as well as that required for the ordinary gymnasium. Children with minor developmental defects as well as those suffering with more severe lesions were treated. It seemed to Dr. Hess that such an institution, or a number of such institutions, either connected with the dispensaries of the city, or run in some of the hospital dispensaries, could do a vast amount of good.

Dr. Staples closed the discussion of his paper by saying that he would like to refer Dr. Walker to Dr. Mumford's papers. In those papers he claimed that the intelligence of these patients was improved through educational methods.

Dr. Staples thought it true that these patients were benefited by institutions, but often a patient's family were willing to make any sacrifice or go to any degree of discomfort to aid, possibly an only child. For this class it seemed to him there ought to be home treatment.

Dr. Clifford D. Grulee read a paper on

THE LENGTH OF THE INTERVAL BETWEEN FEEDINGS.

(See page 773.)

Dr. A. C. Cotton said he heartily concurred in the principle underlying Dr. Grulee's paper, whether he agreed with all the details or not. He thought it a timely paper in calling attention to the advantages of prolonging the interval in feeding. He, however, believed that the lengthening of the interval early in the infant's life to four hours would be found most advantageous in artificially fed babies. In the feeding of cow's milk the physiology of the digestive process demands longer intervals between feedings than in breast-fed infants. Aside from doubtful questions, this much is known: that it takes longer to empty the stomach of a meal of cow's milk than it does of mother's milk.

Dr. Cotton believed more dilatation of the stomach came from too frequent feeding than by the injection of a large quantity of food filling the stomach, but allowing a sufficient time to dispose of it. He thought, therefore, that there should be a differentiation in frequency between the feeding of breast milk and cow's milk. The interval between feeding in the latter case should be four hours and in the former two to three.

Dr. Effa V. Davis thought it important to bring attention to the time element, but a mistake to make a hard and fast rule. In studying the quantity received by the child through the means of weighing before and after nursing, she discovered it was not impossible for some children to take as much as five ounces by weight at a feeding in the second week of life. Some children took this amount and kept it, while others rejected it or showed indigestion.

Dr. E. L. Lackner referred to the tables for infant feeding, and cited the experience of a physician whose two children, both breast-fed, from the day of birth to eight months were fed five times a day and had seven hours of sleep, with satisfactory increase of weight and development. Thus it is apparent this principle can be applied to breast-fed children. The mother also had seven hours of sleep at night.

The children were taught to take both breasts. It was difficult at first to bring them to this point, one taking about a week and the other about three weeks, but it was brought about.

Dr. Lackner introduced Heubner's tables, methods, and intervals of feeding, etc., into Michael Reese Hospital about three years ago, and they are still carried out with the greatest success.

Dr. H. W. Cheney said he heartily agreed with the conclusion that the longer interval in feeding was better for artificially fed children, and that this was equally true of breast-fed children.

There was another reason for the longer interval—it was advantageous to the mother, as it lessened the liability of cracked nipples and those already inflamed from frequent nursing were very often healed by the longer rest between feedings.

It has been his experience with the average new-born baby that it is so well nourished it does not need feeding oftener than every six hours, and that the child is completely satisfied with that interval of feeding for the first two days. Then, from that time on, he never allows these babies to be fed oftener than every three hours, and often they are satisfied with four-hour feedings.

Dr. F. X. Walls believed the proper spacing is of relatively more importance than the character of the food; at least to the degree that even the best food, improperly spaced, will disagree with the average infant, while an inferior food, properly spaced, will better agree with the child.

He thought, perhaps, no definite rule could be laid down, but his experience, extending over a considerable period, led him to believe that almost no infant, breast fed, artificially fed, premature or well developed, requires food oftener than every four hours.

Dr. J. J. Gill said his experience had been more especially with breast-fed children. One fact he thought was clearly brought out—that too frequent nursing depleted the mother's supply of milk, and that increased milk in the breast caused an increased flow. He believes that not only did the babies thrive better on long interval feeding, but the advantage to the mother and the increased flow of milk were additional reasons for that method.

Dr. Grulee, in closing the discussion of his paper, said that he had purposely avoided saying anything about the constituents of the food, as suggested by Dr. Cotton.

In reply to Dr. Davis' suggestion, he said he did not lay down any hard and fast rule, and purposely cited a case in which he had not followed the schedule, because he did not think it would be good for the child, but he did say that in practically all the cases he had observed he thought the long interval could be applied.

He referred to Dr. Gill's suggestion that the presence of milk, due to the longer interval, increased the flow of milk. He said the idea of the stimulation of the mother's breast advanced by Budin was entirely different from this advanced by Dr. Gill, the former believing that the frequent nursing of the child stimulated and increased the flow of milk. That had been the only question in his mind in the case of breast-fed children.

Serum Treatment of Scarlet Fever.—(*Jahrb. für Kinderhk.*, Berlin, Vol. LXVI., No. 5). The mortality in the severer cases was reduced under the serum treatment from 47.4 to 16.1 per cent. in the extensive experience in Russia related. The action seems to be antitoxic, but no effect on the complications of the disease were observed. The frequency of by-effects and the large amounts of the serum required are the dark side of the experiences related. In Moltschanoff's experience the mortality dropped from 16.2 to 10.4 per cent. The temperature always subsided after application of the serum and sometimes the pulse, respiration and nervous phenomena also showed marked improvement, but there did not seem to be much of an effect on the disease process as a whole. The duration of the fever or of the sickness did not seem to be influenced and the throat lesions were not modified, while there was no evidence that it prevented complications or influenced their course.—*Journal of the American Medical Association.*

Current Literature.

ABSTRACTS IN THIS NUMBER BY
DR. E. C. FLEISCHNER. DR. ALFRED F. HESS.
DR. M. NICOLL, JR.

PATHOLOGY.

PLAUCHU AND RICHARD: GOITER IN THE NEWBORN. (*La Pathologie Infantile,* July 15, 1907, p. 145.)

The disease has been recognized for many years, but only of late has it been carefully studied, especially in the mountainous regions about Lyon and Toulouse. The size of the gland may vary from that of a small nut to that of an adult fist, the weight from 16 to 41 grams.

Three varieties have been discribed—the vascular, parenchymatous and cystic.

Pressure on the trachea and the esophagus are frequently met with, together with congestion of neighboring organs from pressure on the blood vessels.

In regard to causation, Richard has shown the importance of heredity. Of 24 cases, in 22 the mother had goiter; in 1, the father, and 1 both parents. The symptoms noted are due to the pressure above described and are very frequently fatal. Thus, in a series of 50 cases, death occurred at birth, or shortly after, in 60.5 per cent. If the child lives, the tendency is for the tumor to diminish in size. Treatment for the less severe symptoms should be undertaken with a view of diminishing local congestion. For the severe cases, exothyropexy is recommended as a life saving and curative measure. Thyrodectomy is not advocated. M. NICOLL, JR.

MEDICINE.

MARBURG, OTTO: TABES DORSALIS IN INFANCY AND CHILDHOOD. (*Mitteilung. der Ges. für Inn. Med. und Kinderhk. in Wien,* January 23, 1908.)

From 1899 up to the present time 51 cases of locomotor ataxia have been reported in children. In 34 of these hereditary syphilis was an etiological factor, in 4 acquired syphilis was found, while in the remaining 13 no specific history was obtainable. In only

12 cases was there a true acquired predisposition to the tabes, *i.e.*, the parent had locomotor ataxia or paralysis. Tabes in children, in contrast to the condition in adults, is found more frequently in female than males, the ratio being 3 to 2. The symptoms are also somewhat different in children than in adults. The Romberg symptoms and ataxia, which are found in 80 per cent. of the adult cases, and which are sometimes very severe, are only found in 56 per cent. of the cases in children and are very mild. Optic atrophy, on the contrary, is found in 44 per cent. of the children, more than double the percentage found in adults. In 48 per cent. of the cases reported in childhood, bladder disturbances were present, and in about 20 per cent. they were the first symptoms, being ushered in by ordinary enuresis. This is especially important in children, where enuresis is so frequent, because it may precede the other symptoms of the locomotor ataxia by several months.

Tabes dorsalis in children runs a relatively mild course.

E. C. FLEISCHNER.

HYGIENE AND THERAPEUTICS.

LEVY, E.: EXPERIENCES WITH THE KOLLE-WASSERMAN ANTIMENINGOCOCCUS SERUM. (*Deutsch. Med. Woch.*, January 23, 1908.)

The author reports the result of the Kolle-Wasserman serum (introduced by these investigators in 1906) when employed in a small epidemic occurring in the army barracks at Essen. He found its use subcutaneously of little avail. However, when injected in large doses into the spinal canal its effects were striking; in 17 cases where it was thus given only 2 died, a mortality percentage of 11.76, or, if we exclude 1 moribund case, the percentage of death is only 6.25. The course of the disease was likewise favorably modified, the fever less marked, and the complications less frequent. The average dose the writer places at 20 c.cm., which in 7 cases should be increased to 30 or 40 c.cm., and should be decreased below this amount only in the case of infants. No harmful effects from the serum injections were observed, and, therefore, its general use is strongly urged.

ALFRED F. HESS.

ARCHIVES OF PEDIATRICS.

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Original Communications.

THE CUTANEOUS AND OPHTHALMIC TUBERCULIN TEST IN INFANTS UNDER TWELVE MONTHS OF AGE.*

BY HENRY L. K. SHAW, M.D.,
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A working knowledge of clinical and laboratory aids to diagnosis is required to practice medicine conscientiously. The laity are fast becoming educated to the fact that a correct diagnosis is an essential and a necessary preliminary to successful treatment. The interest aroused by any new method of diagnosis or clinical test shows how earnest the profession is in the endeavor to make a correct diagnosis. In no disease, perhaps, is an early diagnosis more important and more difficult to establish, especially in early childhood, than tuberculosis. The earlier the diagnosis, with proper treatment, the greater is the chance of recovery.

Physical examination reveals little in incipient cases except to skilled observers. The presence of tubercle bacilli is only detected when the disease is well established, and it is with great difficulty that the sputum can be obtained from infants and young children. Cyto-diagnosis, serum reactions, and the opsonic index require skilled laboratory specialists.

The subcutaneous injection of tuberculin has been relied upon by many, but this is a procedure open to criticism and will never become popular. It requires a hospital and trained nurses and is not justifiable in a routine examination.

Von Pirquet, of Vienna, published, in April, 1907, his results of cutaneous vaccination with tuberculin. He found a characteristic reaction in tuberculous individuals and formally announced the cutaneous tuberculin test.

Wolff-Eisner, of Berlin, inspired by Von Pirquet, published about a month later his results from instilling a drop of a weak solution of tuberculin on the conjunctival mucous membrane. He found a constant and specific reaction in tuberculous subjects, and called it the conjunctival tuberculin reaction.

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* Read at the International Congress of Tuberculosis, Washington, D. C., October 1, 1908.

Calmette, of Paris, published a month later than Wolff-Eisner a series of similar experiments, but undertaken independently, with identical results. He employed the term ophthalmic test.

Moro, of Munich, recently found he could obtain a specific reaction on the skin of tuberculous individuals by simply rubbing in an ointment containing tuberculin. This he termed the percutaneous test.

These tests all depend on the local effect of tuberculin on the tissues and the vast amount of literature which has appeared in the past twelve months shows how eagerly the medical profession has grasped at a simple, harmless and inexpensive method of obtaining an early diagnosis in that all too frequent disease—tuberculosis.

The technic of the cutaneous and ophthalmic tests is familiar to you, and the purpose of this paper is to discuss their application in infants under twelve months of age.

Von Pirquet employed the cutaneous vaccination on 147 infants under three months of age and had no reaction. Of 64 vaccinated from the third to the sixth month, 3 reacted positively. He concludes, as a result of his experiments, that the reaction is not common or specific in the first year of life, but becomes more frequent as the child grows older.

Sperk, in the Escherich clinic, vaccinated 159 infants under five months of age with no reaction.

Aronade vaccinated 47 infants under twelve months of age, and one infant reacted who was suffering from tuberculosis of the knee. Forty of these babies were sick with various disorders and only 7 were healthy.

Rietschel had only one positive reaction in 80 infants under twelve months and that was in a clinical case of tuberculosis. Two other infants had undoubted tuberculosis, but they gave no reaction either to the cutaneous or subcutaneous tests.

Faludi vaccinated 195 newborn infants and their mothers with a 25 per cent. solution of tuberculin and obtained 126 positive reactions in the mothers and not a single reaction in the babies. Prouff and Petit vaccinated 54 nursing babies, among whom were those of 12 mothers, who gave a positive reaction.

Feer vaccinated 70 infants under six months with no reaction, and 42 from six to twelve months with three reactions. One of these was clinically a case of tuberculosis and 2 considered suspicious.

Langstein, in 100 vaccinations under twelve months of age, had only one positive reaction. This baby died and the autopsy showed tuberculosis.

Cannata had no reaction in 70 infants under six months of age, and only 3 out of 42 infants from six to twelve months of age.

Brückner obtained three positive reactions out of 31 infants vaccinated, and all these gave physical signs of tuberculosis.

Engel and Bauer report six positive reactions in 48 infants. Five of these showed no clinical signs of tuberculosis and the subcutaneous tuberculin test was negative.

Many of the authors do not specify in their reports the exact age of the children. Czerny stated that all the vaccinations made on infants in his clinic under one year of age were negative, but the number of tests are not given. Baginsky, in a discussion, said that no infant had reacted in his hospital to the cutaneous test.

All the observations referred to were with the cutaneous test, and no detailed account of the ophthalmic test in young infants can be found in the literature. Comby made a series of experiments and concluded that the age of the child materially influenced the occurrence of the ophthalmo reaction. Under one year of age he was unable to obtain any reaction either in tuberculous or non-tuberculous cases.

Von Pirquet, Wolff-Eisner and Moro all use and advocate the employment of tuberculin prepared from the human type of tubercle bacilli. Calmette, however, uses tuberculin prepared from the bovine type. This fact is not generally appreciated, for when I wrote to two commercial houses who prepare and advertise "tuberculin prepared according to Calmette" for the ophthalmic test, they informed me that this tuberculin was of the human type. I experienced no little difficulty and several months of waiting before I finally obtained the bovine tuberculin, which was used in the tests to be described later. Of great interest in this connection is the work of Detre, of Budapest, who claims the possibility of a differential tuberculin reaction to determine whether the infection is of human or bovine origin.

The writer made two series of tests on infants under twelve months of age at St. Margaret's House, Albany. This institution admits only infants under twelve months of age, who are sent in by their parents on account of sickness, improper feeding, etc., or babies committed by the city or county authorities for various reasons. The first series was on 47 infants last February, 14 of whom were under five months of age. A supply of tuberculin (human) especially prepared and donated by Dr. Baldwin, of Saranac, was employed in dilution of 1-100 and 1-200. The 1-200 dilution was used first, one drop being instilled in the left eye. There was no reaction in any of the babies. A couple of weeks later a drop of the 1-100 dilution was dropped in the same eye with the same result. Shortly after this a cutaneous vaccination was made on the same infants using tuberculin (human) furnished by Prof. Veranus A. Moore, of Cornell University. One case showed a slight reaction. This was an old case of empyema with a discharging sinus. The pus was injected in a guinea pig who died later of tuberculosis. While not included in the scope of this paper, it is of interest to note that the Baldwin tuberculin—1-200—gave a positive result in 8 older children with known bone tuberculosis.

A second series of tests were made at the same institution in August on 34 infants, 16 being under five months of age. In this series a drop of a 1 per cent. solution of bovine tuberculin was instilled in the left eye and a drop of a 1 per cent. solution of human tuberculin in the right eye. No reaction occurred in either eye. Vaccinations were also made with both types of tuberculin with no reaction. A drop of the full strength of bovine tuberculin instilled in the eyes of 4 infants produced absolutely no irritation.*

The babies appeared to object more to pulling down the lower lid and instilling a drop of tuberculin in the eye than to the vaccination. The crying which occurred in the older infants might possibly wash away the tuberculin and render the test unreliable. There were no bad effects from either test. None of these 81 infants showed any physical or clinical signs of tuberculosis, and in 4 who died later and where an autopsy was made no evidence of tuberculosis was found.

The results of my experiments on 81 infants under twelve months of age show no reaction to the ophthalmic test with both human and bovine tuberculin in solution of various strengths.

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* One of these babies, age three and one-half months, subsequently died and the autopsy revealed an acute miliary tuberculosis.

The cutaneous tests in the same infants gave one reaction. Bovine tuberculin was used in 34 cases with no reaction.

The status of both these tests seems to be secure, and in older children and adults they are most important aids to diagnosis. In young infants, however, they cannot be said to be as reliable. The autopsies on infants by Czerny, Binswanger and Hamburger show that of 1,002 autopsies on infants under three months of age, tuberculosis was found in 23, or 2.3 per cent.; 542 autopsies from four to six months, 62, or 11.1 per cent., and 463 on infants from seven to twelve months, 92, or 19.9 per cent. The published statistics show that less than 1.5 per cent. of all infants under twelve months of age react to either test or either type of tuberculin.

The cutaneous test is simple, easy of application and absolutely without danger. Its use is preferable to the ophthalmic test, as a number of instances of injury to the eye have been reported.

RHEUMATISM AND CHOREA.—The close association between rheumatic fever and chorea on the one hand and rheumatic fever and an infective condition of the throat on the other have been recognized for a long time. M. de Ponthière maintains, as a result of careful observations carried out for some years, that chorea is also closely associated with unhealthy and enlarged tonsils and adenoids. He is of opinion that chorea is usually a symptom of an autointoxication produced by the absorption of septic material formed in the nasopharynx, the infection being usually of a rheumatic nature. He finds that removal of the tonsils and adenoids in such cases is invariably followed by cessation of the choreic symptoms. He points out the analogy between the symptoms of the adenoid condition and those of the choreic patient; defective respiration, disturbed nights, night screams, dyspnea, defective intelligence, heavy aspect, digestive troubles, etc. The comparison is probably somewhat overdrawn and exaggerated, but it is fairly well established that the rheumatic infection takes place in a large proportion of cases through the throat, and an unhealthy condition of the nasopharynx may probably keep up the infection as well as offer a source of reflex irritation by which the peculiar choreic manifestations may be excited.—*The Hospital.*

CONGENITAL HYPERTROPHIC STENOSIS OF THE PYLORUS, WITH THE REPORT OF TWO CASES SUCCESSFULLY TREATED BY GASTROJEJUNOSTOMY.

BY E. W. MITCHELL, M.D.,

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AND

J. C. OLIVER, M.D.,

Dean and Professor of Surgery, Miami Medical College, Cincinnati, O.

Hezekiah Beardsley reported the first case of this kind in 1788. "The report appears in the earliest volume of *Medical Transactions* issued in this country, entitled 'Cases and Observations by the Medical Society of New Haven County in the State of Connecticut.'" Dr. Osler republished this interesting report in the Archives of Pediatrics, May, 1903. Similar cases were reported in 1841 by Williams (*London and Edinburgh Monthly Journal of Medicine,* 1841, p. 23), and by Devoski in 1842 (*Caspari's Wochenschr. f. d. Ges. Heilkunde,* 1842, No. 7). However, it was not until 1888 that the condition was clearly defined and the attention of the profession drawn to it by Hirschsprung (*Jahrb. für Kinderhk.,* 1888, Vol. XXVIII., p. 61). Since then reports have gradually increased in number as physicians have learned to recognize the cases. This rapid increase in the number of cases reported no doubt means that heretofore the cases were not diagnosed and that the condition is more frequent than was formerly supposed.

As to the pathogeny there has been great difference of opinion, and we are, indeed, quite in the dark as to the primary cause of the hypertrophy of the pyloric structure. It has been questioned by high authorities as to whether there was a true hypertrophy. This point may be considered as definitely settled, at least in regard to the extreme cases which come to the operating table or to autopsy. Microscopic examination has repeatedly shown great increase, particularly in the circular fibers of the pylorus, also some increase in the longitudinal fibers, with some proliferation of the connective tissues. The pyloric wall in these cases has two or three times the thickness of that normally found in children of the same age. It has also been questioned as to whether the cases were truly congenital, whether the hypertrophy was not secondary to pyloric spasm arising postnatal from irritating food or hyperacid gastric secretion. Sufficient evidence to the contrary would seem to be the fact that many of the cases show symptoms too soon after birth and show too great a degree of hypertrophy to have developed even within a few weeks; also the fact that in the majority of the cases reported there have not been evidences of indigestion or of errors of diet; in fact, more than 50 per cent. of the cases have been breast fed.

The various *theories* of *causation* have been well stated in an excellent paper by H. J. Nicoll (H. J. Nicoll, *British Medical Journal,* September 1, 1900, p. 571), as follows:—

I. That the condition is the result of primary congenital developmental aberration, possibly connected with the junction at the pylorus of two different processes of development.

II. That it is the result of congenital hypertrophy of the muscular walls of pylorus secondary to antagonistic and incoordinated action of the stomach on the one hand, and the walls of the pylorus on the other, this incoördination being dependent upon functional disorders of the gastric nervous system resulting in spasm.

III. It is the result of spasmodic contraction arising from gastric (dyspeptic) irritation after birth and therefore not congenital.

IV. That the condition is the result of chronic inflammatory processes.

That functional spasm plays a considerable *rôle* in the production of symptoms cannot be doubted. The alternating improvement and relapses very commonly seen would indicate it; as would also the cases which recover under medical treatment. The pyloric muscle has not only the function of contraction, but also that of dilatation. Even with much thickened walls there is not, of necessity, complete obstruction. The degrees of hypertrophy and the degrees of spasm will vary widely in different cases. Numerous cases of recovery under purely medical treatment have been reported, cases in which the symptoms and signs have been typical.

It is fair to suppose that in these cases spasm has been the most prominent element and the degree of hypertrophy moderate. There is on record at least one case—that of Dr. Batten (Batten, *Lancet,* December 2, 1899)—in which recovery occurred and death subsequently from another disease, gave the opportunity to prove by autopsy that actual hypertrophy had existed. It is now very generally agreed that two general classes are to be distinguished: First, those in which hypertrophy in a marked degree exists and which are only amenable to surgical intervention; second, cases of pyloric spasm, which are amenable to medical treatment. That there are intermediate cases with minor degrees of hypertrophy with partial recoveries and relapses is very probable. Mair and Landener (*Virchow's Arch.,* 1885, Vol. CII., p. 413) have reported cases in older children and in adults in whom they have found hypertrophy of the pylorus, supposed to be congenital in its origin, since they have had histories of vomiting, etc., from infancy. It has been suggested that some cases classified as cases of recurrent vomiting have been in reality cases of moderate amounts of pyloric hypertrophy, with recurrent attacks of spasm. It may be that the finding of acetone and diacetic acid in the urine will be a differential point in distinguishing cases of true recurrent vomiting from the cases of pyloric spasm.

The best text-book consideration of this subject is found in the work of Pfaundler & Schlossmann (*The Diseases of Children,* Am. Ed., 1908, Vol. III.)—written by Pfaundler who has devoted much study to it. He divides the cases into the two classes just mentioned, *viz., Hypertrophic Stenosis of the Pylorus and Pyloric Spasm.*

SYMPTOMS.—I. *Hypertrophic Stenosis of the Pylorus.*—As a rule the babies are plump and well formed at birth. Very rarely are other abnormalities found. Ashby (Quoted by H. J. Stiles, but reference not given) reports one case in which atresia of the anus coexisted. Dr. H. J. Stiles (H. J. Stiles, *British Medical Journal,* October 13, 1906, in discussion of this subject at the Toronto Meeting of the British Medical Association, Pediatric Section, a very interesting series of papers) states that at least one case has been reported in which there was found with the pyloric hypertrophy also idiopathic hypertrophy and distention of the colon. He considers these two conditions to be analogous congenital anomalies. More than half of the babies have been breast fed. The earliest symptom is vomiting, which may begin soon after birth or only after two to six weeks. It may at first appear to be nothing more than the usual regurgitation after feeding, but soon becomes persistent, not yielding to remedies, at times, after two or more feedings when quantity is larger than amount taken; sometimes tinged with bile, showing the occlusion not to be complete; is often of the projectile type; is not accompanied by nausea; the ejected food is usually well digested, showing that the food and the digestive capacity of the stomach are not at fault.

Other symptoms are mainly the result of the vomiting and loss of nourishment; the empty bowel with constipation, progressive emaciation, after some time exhaustion and subnormal temperature, until we finally have the picture of marasmus. The epigastrium is prominent because of the dilated stomach, while the hypogastrium is shrunken because of the empty intestine. The occasional stools passed are composed mainly of bile and mucus. After feeding, the peristaltic waves of the contracting stomach appear like a small ball under the thin abdominal wall, rolling obliquely from left to right—from cardia to pylorus. In some cases the tumor can be felt in the region of the pylorus. In others the tumor lies under the liver where it cannot be felt. In the case to be reported, it was felt on two or three occasions; the peristaltic waves were plainly seen a number of times by my consultants, Drs. Oliver and Lapsley, as well as by myself and the nurse.

II. *Pyloric spasm* is to be differentiated by the lesser severity of the symptoms, the less rapid and less progressive loss of weight—more marked intervals of improvement by response to treatment. In some cases the differentiation cannot be made.

Inasmuch as cases of pyloric spasm cannot, in the beginning, be differentiated from hypertrophy, and since even some cases of hypertrophy may recover without operation, medical treatment should be given in every case not too greatly debilitated when coming under observation. In the first place the food should be made as bland as possible. If the infant is not already on the breast an effort should be made to secure a suitable wet nurse. In the absence of such, or if the evidence is positive that the breast milk is not digested, the blandest and most digestible substitute should be given, such as peptonized milk, whey, albumen water, beef juice, buttermilk, malt-soup, etc. The food should be given in small quantities; at the breast the nursing period reduced to five or six minutes. In some cases the act of swallowing seems to excite spasm, and good results are seen from giving the food by gavage, the tube being introduced through the nostril. Supplemental feeding per rectum should be carried out systematically. Inunctions of fat (sterilized lard being best) may also be given.

The second indication is to remove from the stomach irritating material, by lavage. Too frequent use of the stomach tube may increase the irritation. As a rule, it should be employed once or twice daily and by the physician himself, or by a nurse sufficiently trained to be expert in its use. Bicarbonate of soda is added to the wash water to render it more soothing, to dissolve the mucus and to neutralize the acids present. The tube should be manipulated gently, great care used not to overfill the already distended organ, and the washing repeated until the fluid returns quite clear. The time chosen should be just before the first feeding in the morning and the last feeding at night.

Drugs have little value in the treatment. Alkalies should be used in the cases of hyperacidity. Opium (¼ ♏ of tincture), atropin and cocain may be given for their sedative effect.

Notwithstanding cases of recovery from an extreme degree of marasmus have occasionally been reported, medical treatment should not be prolonged until the infant reaches a state of great debility. If vomiting and loss of weight continue after careful treatment, especially if the temperature begins to fall below the normal, surgical intervention should be made without further delay.

HISTORY OF CASE.—E. M., born September 14, 1907, a well-formed female child, weighing 8 pounds. Mother, *aet* forty years, was rather delicate as a child; for many years has had stomach trouble. Five years ago was treated for ulceration of the stomach. She has always taken cold easily; has spent several of her winters in the South on account of her health. Her first child, now fourteen years of age, has always been healthy, although not robust. She had severe vomiting and was much prostrated during the first three months of her pregnancy. About the third month she noticed a lump on the right side of her neck just above the clavicle, not painful or tender to touch, gradually enlarging until by the fifth month it was about the size of a hen's egg, very hard, somewhat irregular in outline.

On May 27th she was operated on by Dr. Oliver at Christ Hospital. On incision there was a free escape of pus and a tubercular abscess found extending well down behind the clavicle. This abscess continued to discharge and did not completely close until the infant was several months old. Notwithstanding this complication the mother's general health improved, she gained some in weight, and was safely delivered, made a good convalescence and is at the present time in better health than previous to the time of her pregnancy. The only evidence of pulmonary tuberculosis is slight dullness over the apices, slight roughness of the inspiratory murmur and a little prolongation of the expiratory murmur. The child's maternal grandmother and maternal great-grandfather were life-long sufferers from severe forms of stomach troubles, notwithstanding which they both lived to a ripe old age. No history of tuberculosis on either side of the family except that of the mother. Father healthy. As the lacteal secretion was abundant it was decided, in the absence of signs of general tuberculosis, to give the baby a start by allowing it to take the maternal breast. On the third day one feeding of cow's milk was given the child and gradually the breast replaced by the bottle by the end of the second week.

At the end of the first week the child's weight was 8 pounds; during the second week the weight was stationary; during the third week it gained 3½ ounces; in the fourth week lost 1 ounce. Modified milk seemed to be well digested during the first three weeks, but the child took very small amounts at each feeding, usually ½ to 1 ounce; the feeding interval of two hours during the day and one feeding at night; in the fourth week she had occasional vomiting after feeding; there were some curds in the stools. At this time a wet nurse was secured. Her milk seemed to be well digested, but the vomiting increased in frequency and was sufficiently marked in the fifth week to arouse the suspicion of stenosis of the pylorus. The time of nursing was reduced to five minutes, lavage of the stomach was made once or twice a day. In the sixth week the signs of pyloric stenosis were characteristic; vomiting at considerable intervals after feedings, sometimes not until after two or three feedings, and then of a large amount of partly digested milk; bowels obstinately constipated, stools being small, dark-greenish, composed almost entirely of bile and mucus; urine secreted in practically normal amount; temperature varying from 97° to 99°; progressive emaciation; weight at the end of the sixth week 6 pounds. Peristaltic waves over the epigastrium very distinctly seen in the latter part of the fifth week; lower border of stomach a finger's breadth below navel, occasionally a small hard mass could be felt in region of the pylorus. The treatment during the fifth and sixth weeks was: Frequent, very brief nursings, lavage of the stomach, rectal feeding, inunctions of lard. There would sometimes be a day or two of improvement and we would begin to hope that medical treatment would rescue the infant. However, at the end of this time it was evident that only surgical intervention promised relief, accordingly, on November 3d, the child being fifty days old, she was removed to Christ Hospital for immediate operation.

The stomach was very thoroughly cleansed before operation by means of sterile water introduced and removed through a soft rubber catheter. The ballooning of the stomach was very evident, even after the most careful removal of all of the irrigating fluid.

Chloroform was given in a most satisfactory manner by Dr. C. F. Hegner, only a very small quantity being used during the operation.

The incision was made through the right rectus muscle, and so soon as the peritoneum was incised the stomach crowded into the opening. When the stomach was displaced to the left the enlargement at the pylorus was readily apparent to the eye. The pyloric region was very firm and dense to the sense of touch—almost cartilaginous in consistency. The walls of the stomach elsewhere than in the pyloric region were thicker than normal. The stomach did not collapse when the abdomen was opened, nor did it do so when the viscus was subsequently incised. The muscular wall seemed to be hypertrophied and at the same time to have lost its contractility.

An examination of the pyloric region speedily convinced me that a pyloroplasty was out of the question, because of the seeming impossibility of suturing the structures.

A posterior gastrojejunostomy was considered the only proper procedure, because when an attempt was made to dilate the pyloric orifice with the finger so determined a resistance was encountered that it was evident that any force sufficient to push the finger through would be fraught with the greatest danger of rupture.

When the great omentum was turned up eight or ten enlarged glands were found in the mesentery of the small intestine. These glands were each about the size of a grain of corn, of a cream color, and entirely separate one from the other. They presented a typically tuberculous appearance. No attempt was made to interfere with the glands in order to obtain one for microscopic examination, but I am firmly convinced that they were tuberculous in character.

A posterior gastrojejunostomy was made as speedily as possible by means of sutures of fine silk. Clamps were not employed, the viscera being held by the fingers of my assistant, Dr. Inez Lapsley. The abdomen was quickly closed and the patient was put to bed in a fairly good condition.

The small size of the baby and its diminutive organs made the operation a difficult one, but we succeeded in establishing a free opening between the stomach and the jejunum.

It so happened that there was, at this time, a young woman in the obstetric department of the hospital whose baby was just about the same age as our patient, and she kindly consented to act as a wet nurse. This woman was unusually robust and had sufficient milk for both babies. In view of the fact that rectal alimentation had proved unsatisfactory before the operation, we decided to begin feeding breast milk to the patient at the earliest possible moment. Fifteen hours after the baby recovered consciousness a teaspoonful of milk was expressed into a spoon and given to the baby. She took it with avidity and seemed anxious for more.

The patient vomited a small amount of brown fluid one hour after the operation was completed. The temperature reached 102.6° in the rectum four hours after the operation. The pulse became very rapid and irregular after she recovered consciousness, reaching 180 six hours after being returned to her bed. A subcutaneous transfusion of normal salt solution (2 ounces) was given six hours after the operation and $^1/_{150}$ of a grain of strychnin sulphate was given hypodermatically one hour later.

Twelve hours after the operation some black fluid was vomited; three hours later a greenish fluid was thrown up. More bile stained fluid was vomited during the following five hours. It is worthy of note that these were the first occasions on which a bile stain had ever been found in the vomitus.

The feeding of the infant was begun with 1 dram of mother's milk every hour, but this was quickly increased so that she was put to the breast and permitted to nurse on the fifth day after the operation.

A normal stool was passed on the third day after the operation.

The temperature and pulse remained above normal for three days, at the end of which time they dropped to 98.6° and 112 respectively.

The baby vomited occasionally, usually just after nursing, for about two weeks after the operation. There was some yellowish color present in the vomited material. The vomiting seemed to be produced by over-filling of the stomach.

The baby was removed to its home just two weeks after the operation. The wound healed readily, the stitches being removed on the twelfth day.

The baby's weight forms a most interesting chapter in her history. She weighed 8 pounds at birth. At the time of operation she weighed but 5 pounds, 8 ounces. Five days after operation she weighed 6 pounds and 2 ounces with her gown, dressings and diaper on. From then on there was a steady gain in weight. At the present time (March 8, 1908) she weighs 14 pounds and is in every way the picture of health.

REPORT OF CASE II.—Howard B. was in every respect an apparently normal, well-nourished baby at birth, but when three weeks old he began to vomit. The vomiting became persistent and recurred after each feeding, or after two feedings. The act of vomiting soon become explosive in character, the vomitus being expelled with considerable force. Nothing came from the stomach except the milk that had been fed to the baby, and it was usually well digested when expelled. No tinge of bile was ever found.

Various modifications of cow's milk, as well as artificial foods, were tried, but they were all rejected.

Upon examination of the abdomen a dilated stomach was found, and marked peristaltic waves could be seen passing from left to right in the stomach. There was a distinct bulging of the abdominal wall corresponding to the position of the dilated stomach and palpation indicated that the walls of the stomach were thickened, but no tumor could be felt in the pyloric region.

The patient was passing nothing from the bowels, and enemata did not bring away any fecal matter.

After careful treatment for three weeks the baby's condition was much worse than it was at the beginning of the trouble. It had lost continuously and steadily in weight. It was always hungry and would take food with eagerness, only to vomit it in the course of a short time.

When the baby was brought to the Christ Hospital it weighed 6 pounds and 8 ounces—its appearance was fairly good, except for the fact that the skin hung in folds and the face was lined and seemed like that of an old man. He was hungry and restless.

The only preparation in this case other than that of the skin, was a careful cleansing of the stomach by means of decinormal salt solution introduced and withdrawn through a soft rubber catheter.

The patient was anesthetized with a few drops of chloroform and the abdomen opened just to the right of the median line. The pyloric region was much infiltrated and presented a circular induration which was very firm to the sense of touch. The infiltration was not so widespread or hard as in the previous patient.

It seemed possible that a pyloroplasty could have been made, but in view of the success in the former case and also because of the possible inutility of this measure a posterior gastrojejunostomy, without clamps, was made. The abdomen was closed by tier sutures introduced through the peritoneum, rectus muscle, fascia and skin respectively.

Feeding of breast milk, 2 drams every two hours, was begun on the day following operation. He vomited occasionally, but the nourishment was for the most part retained. Bile was present in the material vomited after the operation.

The child improved slowly, but had considerable fever during the first three or four days after operation. The fever was attributed to an acute gastroenteritis, the evidence of which consisted in the appearance of a considerable amount of green-colored mucus, which was expelled both from the bowels and stomach. This gradually subsided and the patient began to improve.

The baby became quite restless and cried a great deal on the tenth day after the operation. It was difficult to determine the cause for this restlessness, but when the dressings were changed on the eleventh day we were horrified to find that the sutures in the abdominal wall had given way and that a considerable part of the small intestines was in the dressings, outside the abdominal cavity. The intestine was not inflamed, but some lymph was present upon it at two points. The dressings were immediately replaced, the baby was anesthetized, the abdominal wall was cleansed and a secondary suture of the incision made. Through and through interrupted sutures of silkworm gut were introduced about one inch back from the margins of the wound, and a second continuous suture of the skin edges was employed.

This unusual happening did not seem to affect the baby unfavorably, because he began taking nourishment two hours after the completion of the second suturing and continued to take his rations regularly thereafter. Several stitch hole abscesses developed about the points of puncture, but these seemed to be of service in that they caused sufficient irritation to insure prompt healing of the tissues.

The patient lost his wet nurse about three weeks after the operation, so we had to resort to modified cow's milk for his food.

He went home in good condition April 20, 1908, five weeks after operation.*

I have knowledge of 2 other cases of this affection—one in the practice of Dr. Elizabeth Campbell, the other in that of Dr. L. S. Colter. In each case a gastrojejunostomy was performed, but both patients died.

So far as I know, these 4 cases represent the total of this class of cases recognized in this vicinity, and these have all occurred within the past two years. The fact that 4 cases have been recognized in the past two years leads one to believe that in times past many unrecognized ones have existed.

Cases similar to those reported are either comparatively rare, or else in many the true state of affairs is not recognized. Dr. George F. Thompson (*Surgery, Gynecology and Obstetrics,* Vol. III., p. 527) says that the total number of cases recorded up to June 1906 is 157. I have not hunted up the number of cases recorded since that date. It is quite probable that some, at least, of the cases of so-called marasmus and inanition may belong in the class of stenosis of the pylorus.

The group of symptoms which may be regarded as characteristic of this condition are repeated vomiting of well-digested food one or two hours after nursing, the absence of bile in the vomited matter, the very small amount of fecal matter passed through the intestine, the dilated stomach, and the presence of a tumor in the pyloric region when it can be detected by palpation. The absence of bile in the vomited matter may be regarded as a valuable differential point in favor of pyloric obstruction as against intestinal obstruction. I can only find that bile was present in the vomitus of but two of the recorded cases. One may infer from this fact that the obstruction was not so complete as usual in these two patients. In these two instances one may *a priori* assume that some of the digested milk passed through the pylorus into the intestine and that the amount of fecal matter was greater than in the usual run of such cases.

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* September 28th.—Both children reported in good health and growing satisfactorily.

When the group of symptoms given above is present and persistent, operative intervention becomes imperative according to my judgment. Even though the obstruction be only due to spasm, as is claimed by some writers, it is more than probable that such patients will die of inanition, because any spasm that is so intense and prolonged is fraught with the greatest danger to the patient. The only cases in which delay may seem justifiable are those in which the stools give evidence of at least a portion of the food being carried through the pylorus. One may be justified in waiting in these cases, but if the babe's nutrition is poor and there is a continuous loss of weight in spite of the passage of some food surgical measures are called for.

One of the most interesting features in the first case herewith reported lies in the suggestion of the possibility of tuberculosis being the underlying cause of the condition found in the pylorus. One cannot, in the absence of microscopic examination, be sure that the mesenteric glands were tuberculous, but I am as fully convinced as one can be under the circumstances that these glands were of that character. The fact that the glands along the curvatures of the stomach were not involved would seem to negative the tuberculous nature of the lesion in the pylorus, and suggest the possibility of tuberculosis in the intestine. There were no evidences of tuberculosis of the peritoneal coat of any of the intestines that came into view during the operation, but because of the urgent necessity for celerity no effort was made to even attempt an examination of any coils except those that presented themselves in the incision. We felt that any systematic search of the intestine would not have been justifiable under the circumstances.

I have not been able to find any reference in the literature to the possibility of this affection being of a tuberculous origin, except that Dr. Thomson (*Scottish Medical and Surgical Journal,* June 1897) describes a case in which the thickening—examined postmortem—seems to have been purely an increase in the amount of submucous lymphoid tissue, and in reports of postmortem examinations in several of these cases mention is made of the fact that hypertrophied lymphoid tissue has been found in the submucous layer of the walls of the pylorus. (Another fact that might be of importance in this connection, is that cure has followed the simple dilatation of the pylorus. Might it not be possible that the good result could be attributed to the well-known benefit following a simple laparatomy in tuberculous peritonitis?) It may be quite possible that two separate and distinct conditions were present in this patient, and I am inclined to believe that such was the case. Tuberculous infection in an infant conceived and carried by a tuberculous mother might be readily explainable under these circumstances. This case seems to throw some light upon the mooted question of congenital tuberculosis, but its value must be slight because of the absence of any direct proof of the tuberculous nature of the infiltration in the mesenteric glands. Were this point definitely established one could not avoid the belief that children may be born with active tuberculosis present in them, because I am sure that if those glands were tuberculous they represented a period in the disease which would have required more than six weeks for its development—hence the process must have begun before the birth of the child.

CHOICE OF OPERATION.—There has been some discussion as to the proper kind of operation to perform in this class of cases. Dr. Cautley and Mr. Dent, who seem to have had most experience in this affection, favor pyloroplasty. Available statistics indicate that the mortality after pyloroplasty and gastrojejunostomy is just about the same, therefore there cannot be much controversy on this score. Mr. Dent claims that the operation of pyloroplasty is much simpler, more rapidly performed and requires much less handling of the viscera. I am inclined to believe that many of these cases are not suitable for the operation of pyloroplasty, but that it would be the operation of choice in all cases in which it is practical. It is highly probable that many of the cases, like the ones herewith reported, are not suitable for the plastic operation, hence a gastroenterostomy would be imperative. For reasons applicable to other cases of pyloric stenosis a posterior opening of the stomach is preferable to one on its anterior surface.

From the experience derived from the cases of this affection already reported we may assume that the earlier recognition of the condition present and the more prompt resort to operation should lead to a very great reduction in the mortality, which at the present time is 50 per cent. after pyloroplasty or gastrojejunostomy.

PRESENT KNOWLEDGE OF WHOOPING-COUGH.*

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Whooping-cough was probably not known until after the middle of the sixteenth century; the first undoubted description of it (Hirsh) is ascribed to de Baillou (1578) who described an epidemic occurring in Paris. In the following century in England it was mentioned by Thomas Willis (1658) and by Sydenham (1679). Since then, as the disease has become cosmopolitan in its distribution, descriptions have been increasingly frequent.

Because of their bearing upon its importance as a destroyer of life, a brief glance at the mortality statistics compiled by the United States Census Bureau is of interest. The registration area to which the figures refer comprised, in 1906, slightly less than half of the entire population of the United States. Previous to 1906 figures were available only for a smaller portion of the entire country. In 1902 whooping-cough caused 3,854 deaths and ranked fourth among epidemic diseases of all ages as a cause of death; in 1903, 5,171 deaths with fourth rank; in 1904, 2,183 deaths with sixth rank; in 1905, 3,599 deaths with fourth rank; while in 1906, 6,324 deaths were due to it—typhoid fever and diphtheria only of the epidemic diseases giving a greater mortality; measles, influenza, scarlet fever and dysentery respectively being next.

These figures are more striking when we consider the fact that 96 per cent. of the 6,324 deaths in 1906 occurred in children under five years of age. Of all diseases of whatever nature occurring in children under five years the number of deaths caused by whooping-cough was only exceeded by those due to diarrhea and enteritis, pneumonia, "convulsions," meningitis and diphtheria, named in the order of their importance.

In 1906 there were, from all causes and for all ages, 658,105 deaths; 1 in every 104 of these was due to whooping-cough. Twenty per cent. of the total deaths were in children under one year, viz., 133,105, of which 1 in every 37 was due to whooping-cough; from one to two years, 28,860, of which 1 in every 20; from two to three years, 12,188, of which also 1 in every 20; from three to four years, 7,450, of which 1 in every 26; and from four to five years, 5,375, of which 1 in every 32 deaths was due to whooping-cough.

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* Read at the Meeting of the Clinical Society of Washington, D. C., October 12, 1908.

Without further array of figures let us look at what it is doing in our midst this year in the District of Columbia. Figures obtained from the Health Office for the first nine months of 1908 show that whooping-cough, or its complications has caused 33 deaths, a greater number than meningitis (20), diphtheria (14), scarlet fever (4) and measles (1).

Whooping-cough, essentially a disease of early childhood, is one to which the race is especially susceptible. All ages may contract it. Infection has taken place in premature infants, in full term infants on the first day of life as well as during the early weeks, and was noted 1,242 times, about 20 per cent., in infants under one year of age out of a total of 6,469 cases reported in Vienna in 1899-1901.* Slightly over two-thirds of these cases were in children five years old or under. Over half the cases are in children under two years. Cases are known to occur rarely in adults and in old age.

In nearly 12,000 cases the ratio of those affected was six girls to five boys. It is doubtful whether season *per se* has much to do with the occurrence and prevalence of the disease. By some we are told that it is more common in winter, like other diseases, which affect the respiratory tract; while others say that cases are more numerous in the spring and summer for the reason that children are more together at play outdoors, with resulting increase in the opportunities for contagion. It is probably true, however, that it is more protracted and complications more frequent during raw and inclement weather.

Study of the sputum of whooping-cough patients has long been the field of efforts to isolate the exciting cause of the disease. The most striking feature of this work is the lack of unity in the results of different workers until within the last few years. They agree now in finding almost constantly in the sputum during the paroxysmal stage a minute hemophilous bacillus indistinguishable in morphology and cultural peculiarities from B. influenzæ of Pfeiffer. The investigators prominently identified with the influenza-like organism of pertussis are Spengler, Jochmann and Krause and others abroad; on this side David J. Davis and Martha Wollstein.

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* Neurath in Pfaundler and Schlossman, "Diseases of Children." Ed. by Shaw and La Fétra, 1908.

Davis* has made a careful study of the literature and done a large amount of work with whooping-cough sputum, and with hemophilous bacteria in themselves and in regard to their presence in other diseases than whooping-cough and influenza. He found the influenza-like organism in 56 of 61 cases of pertussis studied in all stages; Wollstein found it in 29 of 30 cases examined, with special reference to the agglutination reactions of the child's blood with the bacilli isolated. Bacteriologists agree that this organism is not found in the initial stage, but is very abundant in the spasmodic stage throughout its course. Influenza-like bacilli grow only in the presence of hemoglobin, which, according to Davis, may be as dilute as 1 part of hemoglobin in 180,000 parts of media, but they may also be grown on ordinary media in symbiosis with other organisms, *e.g.*, staphylococci, streptococci, pneumococci. They are easily obtained in mixed culture by smearing the sputum on ordinary media, but can be grown in pure culture only on hemoglobin media.

Positive agglutination of these bacilli was found by Wollstein† with the serum of whooping-cough cases in dilution of 1:200, rarely 1:500, by macroscopic and microscopic tests. The various strains of the bacillus all reacted in dilutions of 1:100 at least, with every pertussis blood examined, while reactions were highest and most complete with the blood of the child from whom the organism was isolated. The blood from normal cases was negative in dilutions weaker than 1:10. According to her the agglutinins were, for the most part, common to both B. pertussis and B. influenzæ, but were much more potent for the pertussis organism; specific agglutinins were found to be low, though definitely present.

Various experiments show this influenza-like organism to be of low virulence for laboratory animals. Its virulence for them may be increased by inoculation simultaneously with another organism.

A pure culture smeared in the nose and throat of a young man who had never had whooping-cough so far as known, produced a febrile reaction with catarrh of the nose and throat and cough. The organism was many times recovered in culture and smear, but clinically he failed to show pertussis (Davis).

Bacilli similar morphologically, culturally and in staining, have been found by many competent observers in practically all affections of the air-passages, including whooping-cough, measles, scarlet fever, diphtheria, pharyngitis, influenza, varicella, acute and chronic bronchitis, tuberculosis, etc., in epidemic cerebrospinal meningitis, and in a few normal throats. These organisms *may be* different members of a group of hemophilous bacilli, and only to be distinguished, as Arnheim* suggests, by modern serum diagnosis, agglutination and complement fixation.

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* Jour. Infect. Dis., III., 1, March, 1906, pp. 1-36; *Ibid.*, IV., 1, January, 1907, pp. 66-86.

† Jour. Exper. Med., 1905, 7, p. 335.

In September, 1906, Bordet and Gengou† published the results of their prolonged study of pertussis sputum. In 1900 one of them had found in smears of sputum from a previously healthy child five months old, attacked with whooping-cough in the initial stage, a small bacillus different from the influenza-like organism. It was very numerous, apparently the only organism present, and resisted all efforts at culture. They were unable to find it again for several years, when they obtained it similarly in a two months' infant, just attacked, and succeeded in growing it on glycerin-blood agar containing concentrated extract of potato instead of peptone. The primary growth, even on this medium, was invisible to the naked eye, but showed in smear; and by transplantation it became acclimated, until they were able to grow it on ascites agar in a dense, opaque, whitish streak as free as B. typhosus on plain agar. Agglutination was accomplished by whooping-cough serum, but was found to be variable. Immunized horse serum in 1:5,000 dilution agglutinated all strains. They believe its specificity to be shown by deviation of the complement (fixation de l'alexine), demonstrated by mixing heated pertussis serum, new fresh serum, and a suspension of their bacilli in normal salt; to this mixture was added, a few hours later, goat's blood previously sensitized (by two vol. of serum of a rabbit immunized against goat's blood). No hemolysis occurred. As control they employed the same experiment with normal serum in place of the pertussis serum. Again, with the influenza-like organism in place of their own. In both of the latter tests hemolysis promptly occurred.

In guinea-pigs and rabbits the Bordet-Gengou bacillus has produced death in twenty-four to thirty-six hours, highly irritating products being shown by extensive petechiæ, pleural effusion, and fatty degeneration of the liver.

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* Berl. Klin. Wochenschrift, 31 August 3, 1908.

† Ann. de l'Inst. Past., 9, 1906; *Ibid.*, 9, 1907.

Arnheim* has isolated the same organism in six of twenty sputa obtained at random, and failed in five autopsies. He obtained agglutination of it with the serum of 16 convalescents from whooping-cough in dilution of 1:50 or more. Klimenko† worked unsuccessfully for over a year before getting cases sufficiently early to recover the Bordet-Gengou bacillus, then obtained in it all of five initial cases, one of which proved fatal from pneumonia and empyema. He recovered the bacillus at autopsy of this case from the right heart and exudate of the pneumonic area. In monkeys and dogs he produced a barking cough with it. One monkey was infected through the upper air-passages. Another healthy monkey was intentionally confined in the same cage with an artificially infected monkey, and became infected three days later.

For our knowledge of the pathology we are dependent upon postmortems and upon laryngoscopic examinations during life. Whooping-cough kills usually through its complications and the primary and fundamental changes are obscured. Postmortems reveal almost always bronchopneumonia, with or without tubercular alterations of the lymph nodes, together with evidences of pulmonary emphysema, dilatation and hypertrophy of the heart, or complications in the central nervous system, most frequently hemorrhage. A constant finding is a catarrh of the tracheobronchial mucous membrane. It is in the glottis that the little pea-sized lumps of tenacious mucus have been observed during life, driven up possibly by the ciliated epithelium from the deeper bronchial branches; the irritation of these excite through the superior laryngeal nerve the paroxysms of cough.

Variot and Eschbach‡ report a simple case of pertussis, which at autopsy showed no complications of the air passages. "Among the numerous autopsies of whooping-cough which it has been permitted us to do, we have never met a case in which the bronchial apparatus (except a special zone), the lungs, and the glands of the mediastinum, were as completely spared as in this child." There was a rosy tint of congestion in the lower half of the trachea, large bronchi and bronchi of the second order; the last were lined with a thick coating of mucus; below them there was no congestion. In the discussion M. Gillet reported a similar case.

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* *Loc. cit.*

† Centralbl. f. Bakt. &c., I. Abt. Orig., Bd. XLVII., Heft. 3, 1908.

‡ Bull. de la Soc. de Pediatrie de Paris, VIII., 1906.

Whooping-cough is contagious throughout its entire course, from the beginning of the catarrhal stage until cough with expectoration ceases. Many clinicians hold that it is especially contagious in the early stage. The disease is transmitted by direct contagion, as a rule, more rarely by indirect passage of the virus in the room, furniture, clothing and toys. The sputum seems to soon lose its virulence. Illustrative of its extreme contagiousness, Kerley* relates the following: "On a bright, cold day in December a patient of mine, nine months of age, passed in its carriage on the street a child about the same age who had pertussis. This child was also in its carriage. My patient took the disease. There was no other possible source of infection." Transmission by fomites is shown by the following: " A woman whose two children had whooping-cough was on a ship which touched at St. Helena, and the children's clothing was sent ashore to be washed. The children of the washerwoman contracted the disease, although there was said to be no whooping-cough on the island at the time."†

Knowledge of the incubation, usually given as seven to fourteen days, is inexact, because of the indefinite onset of pertussis. Sometimes the victim seems to cough immediately after exposure. One attack of whooping-cough almost always is followed by complete immunity for the remainder of life. In the very rare cases of a second attack of the disease, it is said to be rapid and light. The so-called "sympathetic" cough which sometimes develops in the mother may be of bacterial origin. During the past summer I had two adults with very irritating coughs without physical signs, who were associated with pertussis children.

A well defined case of whooping-cough is readily recognized by a layman, and it is not uncommon for a mother to bring her child to the dispensary stating that she wants to get something for whooping-cough. The child, however, has symptoms of the disease before this period. Slight prodromal symptoms, as lassitude, headache, and disturbed sleep occur. An acute catarrh of the upper air passages, at times involving conjunctivæ, nose and throat, and cough follow, or simply cough; fever is sometimes present at this stage, but absent during the rest of the disease if uncomplicated. Cough increases for a week or two, becomes spasmodic, choking, more frequent at night than during the day, and gradually assumes the typical paroxysmal character of pertussis. Early blood examination is likely to show an increased leukocyte count with lymphocytosis. A physical examination of the chest reveals nothing abnormal. This last fact, coupled with the failure of the usual cough sedatives, is very suspicious of whooping-cough. Kilmer found that pressure over the umbilicus relieved the cough of cases which proved later to be pertussis. The number of cases in which he has applied this test has been small, and he withholds judgment.

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* The Treatment of the Diseases of Children. 1907.

† Ruhräh, Modern Medicine, Ed. by Osler.

The following 2 cases I saw recently in the catarrhal stage:—

I. Estelle M., five and one-half years. Had never had pertussis. In June, 1908, had been playing outdoors with one or two children with whooping-cough. In two or three days she began to cough. Four days later the cough was dry and consisted of a single expulsive effort; worse at night. Throat and chest examination negative. Temperature normal. Leukocytes 13,000. In ten days she began to whoop, and for the next ten weeks she had a moderately severe paroxysmal stage of the disease. As she was taken out of town two days after I first saw her, no further direct observation was possible.

II. Elizabeth S., aged fourteen years. Had never had pertussis. Living in the same house with the case just related. A few days after the first child in the catarrhal stage left, she began to have malaise. Was given calomel by her mother. The next day she felt no better. Had slight headache and very slight coryza. A dry cough appeared. When seen by me at this time, temperature 100.2°; examination of throat and chest negative; leukocytes 9,600, two days later 9,300. Slight fever lasted only three days. The cough had been worse at night from the first. She went to the seashore and there the typical paroxysms promptly appeared, with frequent vomiting; duration four weeks.

The appearance of the child between paroxysms is suggestive of whooping-cough; the face is puffy and bloated, especially about the eyes, the upper and lower lids standing out like pillows. If there has been subconjunctival hemorrhage, as often occurs, the appearance of the face is yet more striking. The puffiness of the face is explained as due to the venous and lymphatic stasis occasioned by the attack of cough; the lymphatic channels becoming permanently distended produce the edema. If the under surface of the tongue be examined there may be found an ulcer of the frenum, rhomboid in shape, with a thick, white coating. This occurs only in children who have their lower incisor teeth; results from the mechanical contact of the tongue against them during the paroxysm, and is not only found in whooping-cough, but may be present in other severe paroxysmal coughs.

In the spasmodic stage, if the chest be examined before a typical paroxysm, there may be found, on auscultation, a coarse, dry râle and possibly a few moist râles, which disappear during the paroxysm, after which there are signs of emphysema. W. W. Johnston* laid great stress upon the importance of the circulatory disturbances. In the long drawn inspiration there is a rush of blood toward the thorax dilating the right heart, congesting the lungs and other organs, at the same time there is less blood in the left heart and systemic circulation. During the expulsive efforts the heart is compressed, blood is forced into the left ventricle and aorta, the heart is emptied, heart sounds and pulse are weakened, and the venous system is engorged. The result, according to Johnston, is a feeble, dilated heart, shown by weak heart sounds, feeble and irregular pulse, dyspnea, edema of the face and venous stasis of the organs.

The urine from the beginning is said to be pale, strongly acid, of high specific gravity (1.022 to 1.032) precipitating a large quantity of uric acid crystals. The secretion of uric acid is said to be two or three times the normal amount. The blood, as stated, may show an early leukocytosis of about three times the normal number of white cells, running parallel with the intensity of the disease, and more marked in smaller children and during complications.

Churchill† reports a series of 100 cases in which differential counts were made, in 85 per cent. of which a lymphocytosis was found. The lymphocyte ratio in children is normally high, about 54 per cent. at birth, gradually diminishing until it reaches 32 per cent. at ten years. The range in the whooping-cough cases was 34 per cent. to 93 per cent., while the total leukocytes ranged from 10,000 to 112,000, averaging 25,000 to 40,000. Lymphocytosis was present in 15 of 16 cases examined in the catarrhal stage.

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* Arch. Pediat., April, 1895.

† Jour. Am. Med. Assoc., 1906, XLVI., 1506-9.

Leukocyte counts were made by me in the following 6 cases:—

E. M.,	female,	5½	years,	4th day,	catarrhal	stage,	13,000
E. S.,	"	14	"	3d "	"	"	9,600
				5th "	"	"	9,300
E. W.,	"	3¾	"	5 days before whoop,			12,000
S. O.,	"	1½	"	decline of paroxysmal		"	17,600
El. B.,	male	1½	"	very severe	"	"	62,000
Ed. B.,	"	7	"	" "	"	"	26,400

Children infected in the early days of life are said to have a very short catarrhal stage, passing in a day or two to the spasmodic stage. The characteristic whoop may be absent in children under one year old; in them the paroxysms may be replaced by convulsions. Sometimes whooping-cough is so mild as to make the diagnosis difficult. The presence of an epidemic or history of exposure may be necessary to determine the condition; this occurs in older children or adults and in the warmer months of the year especially. When bronchopneumonia complicates whooping-cough, the characteristic paroxysms may disappear. This is sometimes true of vaccinia, which has led to vaccination as a form of treatment.

The average duration of an attack of whooping-cough is from eight to twelve weeks, yet an attack may be prolonged for months.

The complications of pertussis make it a very formidable disease and are largely responsible for its mortality; numerous and varied, they are dependent on one or more of the following causes: The mechanical effects; extension of the infection; lowering of the general tone rendering possible other infections. Hemorrhage is quite commonly seen—subconjunctival, nasal, bronchial, subcutaneous, and, more rarely, intracranial or into the cord with a train of serious lesions. Two of our dispensary cases had frequent epistaxis, and one of these bronchial bleeding. Other mechanical effects are pulmonary emphysema, bronchiectasis, hernia, prolapse of the rectum, and dilatation of the right heart with subsequent hypertrophy.

Tuberculous infection appears to occur quite frequently in the course of whooping-cough; it may be a tuberculous bronchopneumonia, more commonly tuberculosis of the pulmonary and bronchial lymphnodes; the disease may be quite active in these nodes, or latent with subsequent development of miliary tuberculosis. Many tuberculous children date their condition back to an attack of pertussis; two of our recent dispensary cases did so, one a boy aged six years, with well marked tuberculosis of both lungs and pleurisy with effusion; another similar case was in a colored boy of nine years.

General convulsions constitute a complication of young children especially, and indicate a grave outlook. These are more rarely associated with laryngospasm, which also occurs by itself. Measles is often intercurrent.

The following points are suggestive in the catarrhal stage: The greater severity of the cough at night; its increasing severity; the absence from throat and chest of physical signs to account for the cough; the presence of a lymphocytosis; a pale urine, strongly acid, high specific gravity, with increased amount of uric acid; the failure of the usual cough sedatives and antispasmodics.

From tubercular bronchial glands the diagnosis, sometimes difficult, is made by the different course of the two affections, that of whooping-cough being more definite, the paroxysms terminating with vomiting, the lungs being negative, fever absent and whooping more distinct. With enlarged bronchial glands dullness between the scapulæ with bronchial breathing may be made out.

Hypertrophied tonsils, with a reflex cough, may be recognized by examination of the throat and base of the tongue. An imitation cough does not occur spontaneously during sleep, nor has the patient the typical appearance of the victim of pertussis (puffy eyelids, sublingual ulcer). Seeing a typical paroxysm will establish one's diagnosis of pertussis.

In children over four or five years of age and otherwise healthy, whooping-cough is a comparatively mild affection. Its greatest incidence is in the first two years of life, and in these infant patients it is especially fatal. From 25 to 30 per cent. of cases occurring in the first year of life are fatal. Fifty-seven per cent. of the fatalities in the United States in 1906 occurred in the first year; 23 per cent. in the second; 8 per cent. in the third; 4 per cent. in the fourth; 2½ per cent. in the fifth year. After puberty it is rarely fatal. In the first nine months of 1908 there occurred in the District of Columbia 33 deaths from it; during this period 440 cases, doubtless only a fraction of those present, were reported to the health officer, giving a mortality of 7.5 per cent. Epidemics vary in intensity.

Babies especially should be protected from exposure. When the outdoor treatment is carried out, it should be done at home, so as to avoid exposing unaffected children.

Treatment without a specific as yet is unsatisfactory, but much alleviation may be accomplished by intelligent medical aid. Prolonged use of remedies, which favorably influence it for a time, lose their value from tolerance which the child acquires. Because of the strain upon the heart, W. W. Johnston urged rest in bed in severe cases and in the delicate. Attention to hygiene, ventilation, clothing and diet has considerable influence. A rational, fresh-air treatment should always be carried out, for an appreciable reduction in the number and severity of the paroxysms results when the patient is outdoors; and the number of attacks at night will be no greater than during the day if the room be properly ventilated, with a temperature not less than 52° nor higher than 60° F. In very cold and inclement weather and in febrile cases the alternate use of two rooms, with thorough airing or formaldehyde fumigation of the unused room in the interval, is recommended. The clothing should correspond to the season of the year.

Vomiting so persistent as to interfere with nutrition may be lessened by attention to the food. Sometimes soft food is best; again liquids; starchy, strongly tasting or smelling food tends to excite cough. Food is retained best after a paroxysm. Good evidence is at hand as to the relief of vomiting by use of the Kilmer belt. Dr. T. W. Kilmer, of New York,* has advocated the use of an abdominal belt made of linen, with a strip of elastic webbing under each arm, and lacing up the back. Beside the relief of vomiting, he claims that paroxysms are helped, and complications rendered less frequent. Twenty-eight physicians reporting on their results from the use of the belt in a total of 558 cases found improvement in 87 per cent. An objection has been raised to the belt on the ground of its causing hernia. It is doubtful whether the belt is responsible for the hernia.

A large list of drugs has been recommended. I shall mention only those upon which authors seem united in advocating as helpful. As the disease is in part at least an infection of the air passages, it is rational that local antiseptic measures be employed. Inhalation by means of sprays and medicated steam are advisable, and preferable to insufflations. Resorcin, phenol, oil of eucalyptus and creosote may be used in this way. Quinin and antipyrin are popular and uniformly recommended. Quinin should be given in full doses, interrupted, and resumed again. Antipyrin favorably influences the paroxysms. Combined with one of the bromids in syrup of raspberry Kerley found it to be the best prescription he tried. Belladonna or dilute solutions of atropin have their advocates. Used in full doses, as is necessary, they soon lose their effects. There are warm advocates of bromoform, chloroform and fluoroform. In the failure of other things temporary resort to opium derivatives is necessary—codein, heroin, or even morphin. Ruhräh gives first place among the drugs to heroin.

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* Arch. Pediat., February, 1907; Jour. Am. Med. Assoc., XLIX., 1750.

Intubation has favorably affected laryngospasm.

Holt and Kerley make a strong point of reserving internal treatment until the acme of the disease, when it is most needed.

APPLICATION OF TINCTURE OF IODIN IN THE DARK.—In the *British Medical Journal* for November 16, 1907, J. Dunbar-Brunton describes a peculiar property of iodin. If the tincture of iodin is painted on the skin in the dark, or is exposed only to a red light, such as is used in photography, and is covered immediately without being exposed to a white light, it will be absorbed with much greater rapidity than under ordinary circumstances, and it is said not to discolor or blister the skin, even if used for long periods.—*Medical Council.*

NEPHRITIS IN INFANTS.—Carpenter (*British Journal of Children's Diseases,* October, 1907) finds that cases of infantile nephritis are very apt to be overlooked clinically, inasmuch as extensive kidney disease may exist in infancy without dropsy. It is also a peculiarity of infantile nephritic kidneys, whether of syphilitic or simple origin, that they frequently appear normal macroscopically even though they are extensively diseased. Though some cases of infantile nephritis are undoubtedly syphilitic, others are certainly not so, and it is doubtless true that interstitial nephritis may be produced by toxins other than those of congenital syphilis. It is possible that the interstitial nephritis may thus begin in very early life, being due to the presence of intestinal toxins. The combination of parenchymatous and interstitial inflammation is apparently not uncommon in the nephritis of infants.—*Interstate Medical Journal.*

THE LEUKOCYTE COUNT OF NORMAL "INSTITUTIONAL" CHILDREN AND THOSE SUFFERING WITH PERTUSSIS.

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The following leukocyte and differential counts were made at the New York Foundling Hospital. The leukocyte counts were performed in the accepted manner with diluting pipette and counting chamber. For the differential counts Jenner's stain was used, 500 cells were counted in each instance. No attempt was made to distinguish between the various kinds of mononuclear cells. To make a differentiation of this kind is very difficult and unsatisfactory, especially when dealing with children; the percentages obtained even by competent observers vary much with the personal equation, and the results lead to no definite conclusion in the present state of our knowledge. All transitional cells were classed as polymorphonuclear.

In order to have a base line on which to build the data obtained in cases of pertussis, a series of observations on normal children of the New York Foundling Hospital was made as a preliminary step. These children are representative of what may be called "institutional" children. They have a good amount of food, lacking variety from day to day, and made up of more than the usual proportion of carbohydrates; their outdoor exercise is very limited; nearly all of them suffer from at least a slight grade of rickets, subacute bronchitis and an attending secondary anemia. It is no more than natural to expect in the delicately-balanced organism of the child that the leukocyte and the differential count should reflect some of these changes, however slight, from normal hygiene and health. Stengel and White[1] very aptly say: "Increase in the number of leukocytes more frequently presents itself in the blood of anemic children than in adults, and the increase may reach enormous proportions in apparently slight pathological conditions."

From Table I. the average leukocyte counts are seen to be regular and to vary for these children, from infancy to eight years, between 13,850 and 16,391. These counts are somewhat higher than those given by most observers:—

In 22 cases under ten months an average of 13,500 (Jaffe).[2]

For the first one and one-half years of life, 10,000 to 15,000. After the second year, 8,000 (Wile).[3]

In infancy, 9,000 to 14,000. In later childhood, 6,000 to 12,000 (Rieder).[4]

From the second to the sixth year, 9,000 to 10,000 (Denis).[5]

From the second to the sixth year, 12,638 (Karinzki).[5]

From two to fifteen years, an average of 6,700 (Bouchert and Debrisay).[5]

TABLE I.

SUMMARY OF LEUKOCYTE AND BLOOD COUNTS ON NORMAL "INSTITUTIONAL" CHILDREN AT THE NEW YORK FOUNDLING HOSPITAL.

Age in years	No. of counts	Number of leukocytes per cu. mm.			Per cent. polymorph. cells			Per cent. mononuclear cells			Percent. eosinophile cells. Average.
		Highest.	Lowest.	Average.	Highest.	Lowest.	Average.	Highest.	Lowest.	Average.	
under 1	17	22,000	8,100	14.338	60.0	11.4	26.1	88.5	37.6	71.8	1.7
1-2	11	28,900	8,100	16,391	56.6	12.0	30.4	87.2	42.4	68.1	1.2
2-3	20	19,600	9,300	14,645	62.4	26.8	42.7	72.4	35.0	55.6	1.3
3-4	19	29,600	9,300	16,363	70.4	29.4	48.7	70.4	32.6	48.1	2.8
4-5	15	23,800	8,600	14,493	60.0	26.6	40.3	73.2	36.2	53.2	4.7
5-6	12	22,800	7,000	14,692	70.6	37.6	48.0	57.0	23.4	45.7	5.8
6-7	12	20,700	10,400	14,242	61.0	38.6	49.4	57.6	37.2	46.5	3.7
7-8	4	16,400	10,400	13,850	53.2	43.8	49.2	52.2	43.0	46.8	3.5

(Each count represents a different case. Children under one month are not included in these statistics. The percentage of mast cells and myelocytes in every case amounted only to a fraction of a percent and is not recorded.)

The variations between the highest and the lowest count for each year (Table I.), aside from the general averages and the discrepancies between the other observations, quoted above, in which the class of children is not noted, should render the physician cautious in interpreting a high leukocyte count as an indication of disease. It might be of advantage to have figures from normal children, as presented in private practice, to contrast with these from "institutional" children.

The differential count (Table I.) shows the well-known diminution in the percentage of the polymorphonuclear leukocytes at the expense of the mononuclear, most marked in infancy and diminishing with age. A comparison (Table II.) of the above percentages with those given in Rotch's text-book,[5] yields the following table, in which the figures follow each other closely, those of the "Institutional" children being consistently at a lower level.

TABLE II.

COMPARATIVE TABLE OF PERCENTAGE OF POLYMORPHONUCLEAR CELLS.

Age in years	under 1	1-2	2-3	3-4	4-5	5-6	6-7
Percentage as given in Rotch's text-book	34.	41.	43.	50.	56.	62.	56.
Percentage in "institutional" children	26.1	30.4	42.7	48.7	40.3	48.0	49.4

The average percentage of eosinophile cells for the whole series is within the limits that are usually regarded as normal (Table I.); the figures for the periods from four to six years are rather higher than the remainder.

The chief object in determining the leukocytes in cases of pertussis was to ascertain if the blood would furnish the physician a clue as to the diagnosis of this disease at a time when the clinical symptoms were not pathognomonic; that is, during the catarrhal stage preceding the convulsive period and its characteristic whoop. That a definite leukocytosis, with a high percentage of lymphocytes, exists during the paroxysmal stage of whooping-cough has been thoroughly demonstrated by Meunier,[6] Cima[7] and Frolich.[8] Meunier's cases presented an average leukocytosis of three times the normal (average leukocyte count in 30 cases, 23,700; lowest, 9,300; highest, 51,500). Meunier surmises a hyperleukocytosis with a characteristic high mononuclear percentage during the catarrhal stage; Frölich assumes that when the paroxysms are at their height the blood picture also is most marked, being less so during the catarrhal stage; the proof for either one of these assumptions is lacking, as practically no cases in the catarrhal stage were observed by them.

The cases at the New York Foundling Hospital offered the inestimable advantage of being in the institution and under observation before the onset of the infection, and of remaining there during its course and after its termination. With the material so close at hand it was possible to obtain blood counts on several cases during the catarrhal stage and to follow them through the disease. (Table III.) A few cases that were studied coughed in a manner indicating the development of whooping-cough, which diagnosis did not prove correct. (Table IV.) Finally, there was a sufficient number of children to establish the normal counts already referred to (Table I.), and thus give a thorough basis for comparison.

TABLE III.

LEUKOCYTE AND DIFFERENTIAL COUNTS OF CASES SUFFERING WITH PERTUSSIS.

		Catarrhal stage.				Convulsive stage.			
Case. no.	Age in years.	No. of days before whoop began.	Leukocytes per cu. mm.	Per cent. poly. cells.	Per cent. mono. cells.	No. of days after whoop began.	Leukocytes per cu. mm.	Per cent. poly. cells.	Per cent. mono. cells.
1	under 1					10	19,100	23.0	75.8
2	under 1	2	37,400	29.8	68.2				
3	under 1					8	74,400	12.4	85.6
4	under 1	3	19,200	20.4	79.2	15	14,800	32.2	66.2
						11	82,300	11.4	87.4
5	under 1	5	20,800	22.0	77.5				
6	1-2	5	55,400	24.4	75.4				
7	1-2	24	27,500	31.4	66.8				
8	2-3	6	18,500	31.0	67.8	9	13,400	34.2	65.0
						24	15.800	41.0	57.8
9	2-3	15	42,800	13.2	83.2	15	15,400	35.6	57.8
		1	22,600	21.0	75.2				
10	2-3	18	20,400	48.4	47.0	7	20,200	54.6	31.4
		6	19,600	56.2	40.4	24	20,200	42.2	54.2
						180	22,900	52.8	42.0
11	2-3	5	18,400	37.6	61.0	7	14,700	32.0	66.6
						21	12,600	46.4	51.6
						37	13,200	54.0	43.8
12	2-3	5	26,500	33.4	62.4	7	33,700	30.0	64.6
						23	13,000	39.0	57.6
						37	11,100	41.0	56.2
13	2-3					1	15,400	28.4	68.0
14	3-4					24	21,000	28.4	69.0
						59	13,300	39.2	59.0
15	3-4					28	13,600	40.2	59.4
						63	16,100	49.0	49.5
16	3-4					42	12,900	33.8	63.6
17	3-4					7	17,600	11.6	84.8
18	4-5					7	28,400	36.8	52.3
19	4-5	20	14,300	37.0	61.6				
Average			26,415	31.2	66.6		24,756	32.2	64.2

(Only counts within 24 days after whoop began are used to obtain average.)

Almost all of the cases observed during the catarrhal stage of pertussis showed a marked rise in the total number of leukocytes, with a slight increase in the percentage of mononuclear cells at the expense of the polynuclear. (Table III.) The average of these counts compared with the normal average indicates an approximate doubling of the leukocytes and an increase of 5.5 per cent. in the mononuclear cells. (Table V.) In the convulsive stage similar, though less marked, changes occur in the blood count. (Table III.) The averages (Table V.) give a slightly exaggerated idea of the hyperleukocytosis and high percentage of mononuclear cells during the convulsive period on account of the very high figures (leukocytes, 74,400 and 82,300; percentage of mononuclear cells, 85.6 and 87.4) obtained in Case 3. This child showed a normal blood count after its attack of whooping-cough had run its course. At first the possible diagnosis of leukemia was made, because of the blood picture, but since the abnormal blood condition and the pertussis cleared up at the same time, the case was thought to be an extreme example of the leukocytosis of whooping-cough.

Case 10 is noteworthy. In this instance there was no increase in the percentage of mononuclear cells; there was no drop in the number of leukocytes during the convulsive stage, and the same conditions supervened in the observations made several months after the child's paroxysms had ceased. The differential count remained normal throughout, the leukocytes at a constant level of 20,000. As seen from Table I. such a leukocytosis must be considered within the normal range for the children under discussion. This case, therefore, had a normal blood picture throughout the disease. All the other cases cited gave the same blood changes that were enumerated as characteristic during the catarrhal stage of the infection. As an aid to early diagnosis in pertussis the leukocyte and differential count are of very great value, though not absolutely infallible guides.

TABLE IV.

LEUKOCYTE AND DIFFERENTIAL COUNTS OF CASES WHICH COUGHED BUT DID NOT DEVELOP PERTUSSIS.

Age in Years.	Leukocytes per cm.	Percentage of Polynuclear Cells.	Percentage of Mononuclear Cells.
under 1	14,400	14.8	83.0
2-3	14,500	44.0	54.8
2-3	14,100	33.0	55.4
3-4	25,400	65.2	33.8
3-4	16,200	37.8	57.6
5-6	25,800	68.2	26.8
Average	18,400	43.8	51.9

To test the value of these factors a number of cases were studied which coughed and presented the other signs indicative of the catarrhal stage, but subsequently did not prove to be pertussis. (Table IV.) These cases are too few in number to render any very definite conclusions possible. However, as these observations stand they all point to the very definite fact that, when children affected with cough other than pertussis have an increased number of leukocytes, this leukocytosis is accompanied by a rise in the number of polymorphonuclear cells at expense of the mononuclear. Of these 6 cases 2 had a hyperleukocytosis, and in these the percentage of polymorphonuclear cells was well above the normal, while the mononuclear were correspondingly diminished.

TABLE V.

COMPARISON OF THE BLOOD COUNTS OBTAINED IN THE CATARRHAL AND THE CONVULSIVE STAGES OF PERTUSSIS IN CHILDREN WHO COUGHED BUT DID NOT DEVELOP PERTUSSIS, AND WITH CORRESPONDING NORMAL AVERAGES.

	Leukocytes per cm.	Percentage of Polynuclear Cells.	Percentage of Mononuclear Cells.
Average of cases which coughed but did not develop pertussis	18,400	43.8	51.9
Normal average for cases of corresponding age	15,174	42.8	54.2
Average of cases of pertussis during catarrhal stage	26,415	31.2	66.6
Normal average for cases of corresponding age	14,831	36.8	61.1
Average of cases of pertussis during convulsive stage ..	24,756	32.2	64.2
Normal average for cases of corresponding age	14,766	39.4	58.4

CONCLUSIONS.

(1) The average normal leukocyte count of "institutional" children is (13,850 to 16,391) somewhat higher than that usually given. The normal leukocyte count for these cases varies between extremely wide limits (29,600 to 7,000).

(2) The percentages of various kinds of leukocytes in "institutional" children show a slight diminution in the number of polymorphonuclear cells, with a corresponding increase of the mononuclear, as compared with other figures. The percentage of polymorphonuclear cells increases with age in the same ratio as that given for other normal children. The percentage of eosinophile cells is within normal limits.

(3) During the catarrhal stage of pertussis an increase is seen in the leukocytes approximating double the normal, and the number of mononuclear cells is increased about 5.5 per cent. at the expense of the polymorphonuclear cells. In the convulsive stage similar, though less marked, changes occur in the blood count.

(4) Other cases which have an afebrile cough, but do not develop pertussis, may show a hyperleukocytosis. When this is the case there is a marked increase in the number of polymorphonuclear elements at the expense of the mononuclear.

(5) A hyperleukocytosis, coupled with an increase in the percentage of mononuclear cells at the expense of the polymorphonuclear, is a distinct aid in the diagnosis of pertussis during the catarrhal stage.

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OSSIFYING MYOSITIS.—Dighton (*Edinburgh Medical Journal,* April, 1908) describes a case of progressive ossifying myositis in a boy of eleven. In this case, the formation of bone was found in practically all of the larger muscles of the body.—*Boston Medical and Surgical Journal.*

A CASE OF EMPYEMA IN A SUBJECT SUFFERING FROM PURPURA.

FRANCIS HUBER, M.D.,
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Carrière, of Lille (*Journal de Méd. de Bordeaux,* October 27, 1907), called attention to the fact that the condition characterized by a tendency to hemorrhages and insufficient coagulating power in the blood, is the consequence of several pathological factors. Some cases are due to insufficiency of plasma, and others to the presence in the blood of anticoagulating substances, or are the result of a deficiency of lime salts or vascular disorders. Labbé made a distinction between isolated sporadic hemophilia and the hereditary variety, the latter being far more serious in character. Sabrazes insisted upon the importance of taking extra care of the young hemophile, bringing him up, as it were, "wrapped in cotton."

He stated that surgical operations might be performed without fear, among this class, if the precautions recommended by P. Emile Weil were observed; that is, to inject under the skin or into the veins 20 c.c. of fresh blood serum, taken either from man, the horse, or rabbit, even antidiphtheritic serum may be employed. This procedure may also be resorted to every three months as a curative measure. (*New York Medical Journal,* December 7th, 1907.) The intravenous injection of $\frac{1}{3}$ to $\frac{2}{3}$ ounce of fresh animal blood serum reduced the coagulation time to normal and caused actual hemorrhage to cease. It is claimed that within forty-eight hours the blood becomes "perfectly physiological," the improvement lasting for about five weeks. In this connection, a brief reference may be made to the brilliant results obtained in a case of melanemia neonatorum cured by direct transfusion (Dr. S. W. Lambert, *Medical Record,* May 30, 1908).

The therapeutics of the condition will vary, whether a patient is actually suffering from hemorrhage or not, or whether we are merely preparing a hemophiliac patient for surgical operation.

If the diathesis only is to be considered, a residence in a mild or temperate climate, in itself often a curative measure, is not to be neglected.

As to the disease proper, salts of calcium, gelatin and serum therapeutics, with more or less complete rest of mind and body, offer excellent means to combat the tendency to hemorrhages.

Organotherapy has been advised. Thyroid extract has little or no effect; on the other hand, thymus extract and that of the suprarenal gland hasten coagulation.

In all cases of hemophilia the possible existence of congenital syphilis must be considered. Many treated from this point of view have done remarkably well. Calcium chlorid or lactate, both favoring the coagulation of the blood, may be administered in appropriate doses. The remedy must be persevered with, as its discontinuance is liable to be followed by a return of the bleeding. On the other hand, it has been noted that a long continuance of the drug actually reduced the coagulability of the blood instead of having the contrary and desired effect.

Gelatin, either by mouth or by injections (the usual precautions being observed) sometimes yields favorable results.

Izzie A., two and one-half years of age, was admitted to the Beth Israel Hospital February 9, 1908.

Personal History.—Full term, easy delivery, breast fed up to one year, no unfavorable family history as to hemorrhagic tendencies, tuberculosis or syphilis. Social conditions similar to those of the East Side Ghetto.

The present illness began several weeks previously. The onset was sudden, with high temperature and marked prostration. No vomiting reported, cough appeared in twenty-four hours. After a week's duration the fever became less and the other symptoms appeared to have improved somewhat. In a short time the temperature again became elevated, and now was reported to be of an irregular type. Dyspnea marked, slight cyanosis, cough aggravated and distressing, child refused nourishment and occasionally vomited undigested food.

The physical signs now reveal fluid in the left pleural cavity. Exploratory puncture revealed pus. At no time prior to admission was there any blood in the urine or feces, nor could we obtain any history of nose bleed or hemorrhage from the gums.

At the time of admission the general condition of the little patient was miserable. He was pale, emaciated, numerous petechiæ were found upon the upper and lower extremities, also upon the buttocks, relatively few upon the trunk or chest.

At the site of the exploratory puncture made by the physician in charge before admission, there was an area of ecchymosis with some swelling about the size of a twenty-five-cent-piece. No swelling of the gums was noticed, nor were there detected any evidences of subperiosteal hemorrhages of the long bones, tenderness about the knees, etc., pointing to a possible scorbutic condition.

Though there was a large amount of pus present in the chest, it was not deemed advisable to operate at once, in view of the fragile condition of the blood-vessels, the hemorrhagic tendency as evidenced by the appearance of the integument in the neighborhood of the exploratory puncture, etc.

The usual general measures were advised, and, in addition, orange-juice and gelatin were ordered, with a view to improving the condition of the blood and vessels.

In a few days, as the hemorrhages about the first exploratory puncture wound showed evidences of absorption, and as the petechiæ were much paler, it was decided to incise and drain the affected side.

A preliminary exploratory puncture was made, which revealed pus with a pinkish discoloration, due to admixture with blood. In making the incision posteriorly below the angle of the scapula, a fairly large blood-clot, the result of the exploratory puncture made before admission to the hospital, was found in the subcutaneous tissue and the deeper structures. On incising the pleura and directly underneath, a large mass of clotted blood was forced out, followed by the escape of a considerable quantity of fibrin and pus of a pinkish color. Several small vessels were ligated.

A number of strips of gauze were now passed a short distance into the pleural cavity, for the purpose of compressing the vessels and preventing any oozing from the cut surface. The escape of pus was secured by the insertion of a small rubber drainage tube, about one-eighth of an inch in diameter. Several strips of adhesive plaster were applied over the edges of the wound to prevent any hemorrhage. These measures were considered to be justified by the presence of old clots in the connective tissue and just underneath the pleura.

For about a week the pus was more or less tinged with blood, no active oozing, however, took place. The subsequent course, in spite of the development of measles, was favorable in every respect. The anemia disappeared, the cheeks became red and plump. The appetite was good and the little patient was discharged from the Hospital in an excellent physical condition about seven weeks after admission.

A SIMPLE METHOD OF CIRCUMCISION IN THE NEWBORN.*

BY W. REYNOLDS WILSON, M.D.,

Philadelphia.

In carrying out the operation of circumcision in the newly born, simplicity in operation should be kept in view. By comparing the usual method with that about to be described it will be seen that the latter is to be recommended because it conforms to this requirement. Pursuing this comparison further we may note the disadvantages of the usual method, supposing this to be by clamping the prepuce and cutting away the redundant portion with a knife, the skin and mucous membrane afterward being secured by sutures. The first of these disadvantages lies in the incompleteness of the removal of the foreskin in instances where the latter is adherent to the glans. When the clamp is applied the prepuce becomes drawn forward in a roll; the knife may thus remove only a circular band of skin while that portion of the foreskin contiguous with the opening remains. This will, therefore, have to be trimmed away after removal of the clamp. It is, however, in the application of the sutures that the greatest disadvantage lies. The primary object of these is to secure the attachment of the skin to the mucous membrane. Incidentally the control of bleeding is accomplished by the pressure of the sutures. Unfortunately this is not always the case, and it may require a number of sutures to control the bleeding points. The sutures are thus placed irregularly and may have to be tightened to the point of unduly constricting the tissues. As a result edema occurs and the sutures begin to cut. The indentation of the coronal edge of the prepuce which follows and the persistent edema make the results of the operation unsightly. Should any of the sutures become infected a slough may form and the resulting granulation may be more or less difficult to deal with, owing to the adhesion of the dressing to the surface of the wound. The length of time also required for a painstaking suturing of the skin and mucous membrane prolongs the operation unduly, considering it as a simple operation.

In contrast to this the method about to be described presents many advantages. No claim for originality can be put forward in respect to this procedure, as it follows in technic that used in the Hebrew rite with a certain exception. According to the

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* Read at the Twentieth Annual Meeting of the American Pediatric Society, Delaware Water Gap, May 25, 1908.

Hebrew method the foreskin is removed by a single sweep of the knife. This requires skill, and when properly done removes exactly that portion of the prepuce which has interfered with retraction. The writer has found, on the other hand, that it is more desirable to split the prepuce longitudinally on the dorsal aspect with a pair of sharp scissors. Preparatory to this the adhesion of the mucous membrane lining the prepuce to the glans is carefully broken by sweeping the point of the unopened scissors beneath the foreskin. Thus way is made for the introduction of the point of the scissors beneath the prepuce. The skin is first divided and the division of the mucous membrane to a point corresponding to the limit of the division in the skin follows. The mucous membrane is rolled back to the corona and rendered perfectly free. The scissors are now used to trim off the redundant fold of skin on either side of the incision. This is done carefully, while the field of operation is kept free from blood. The redundant roll of skin to the distal side of the frenum is likewise removed in order to avoid the edematous flap, which is often left at this point when enough tissue has not been removed. The skin is now drawn back and carefully inspected in order to deal with any discoverable irregularity in the cut edge. A tape of gauze, a half inch in width and cut so that the edges are frayed, is now applied, securing the roll of mucous membrane in position behind the corona and compressing the bleeding vessels. A tape of about ten inches in length is required in order to admit of several windings. The end of the glans should be left uncovered so that there may be no obstruction to the meatus. It is well to take in, however, the area just beneath the meatus in order to compress the severed frenal artery. One of the greatest safeguards against hemorrhage is to be found in using a coarse-meshed gauze cut with frayed edges in order that it may take up the blood and favor clotting. Over the gauze tape a dry gauze pad is placed and the napkin applied. The wrapping should be changed on the following day and daily thereafter. Otherwise the gauze, which becomes moistened by urine, may cause excoriation. After the second day, instead of the dry gauze, or that moistened by a mild solution of bichlorid or by boric acid solution, a gauze dressing thoroughly spread with vaseline should be applied. This will prevent adhesions of the dressing to the granulations. Should such adhesion occur it would lead to sloughing at the point of adhesion and consequently delayed healing. It is unusual for the swelling to persist after the second or third day.

The indications for the use of sutures in the usual procedure are the coaptation of the skin and mucous membrane and the prevention of hemorrhage. By the use of gauze wrapping the skin and mucous membrane are kept in place, while rapid granulation is favored by the even pressure of the dressing. The bleeding which results from circumcision in the newborn is usually slight, and a moderately firm gauze wrapping, when properly applied, is sufficient to control it. Thus the indications which suggest the use of sutures are fully met by the gauze wrapping. The chance of local infection by the irritation of the sutures when in place is also obviated by the more or less complete protection offered by the gauze.

The objection may be raised that this method is unsurgical, in that we are trusting to an insecure pressure to control hemorrhage and are substituting for sutures a displaceable dressing. These objections may hold in instances where the gauze tape is improperly applied, but only in such instances. Even the apparent unneatness of the dressing is not a valid ground for condemning it, as when the tape is properly cut and evenly applied, especially if it is applied after being moistened, its bulk may be kept within such limits as to make it a neat appearing dressing. If the tape is moistened it usually remains for twenty-four hours without being displaced, but in order to secure it the end of the gauze tape may be split and the two ends thus formed may be lightly tied, as in a finger bandage.

APPENDICITIS IN CHILDREN.—Riedel (*Münch. med. Woch.*, November 26, 1907) reviews the results of operations on 1,222 adults and 310 children for appendicitis, with a mortality of 6.7 per cent. for adults and 16.4 per cent. for children. The reasons for the surprisingly large mortality in children are the carelessness of parents in noting symptoms of a serious nature in children, the difficulty of an accurate diagnosis and the greater severity of the disease in children. Small children are extraordinarily sensitive to infections of the appendix. There seems to be a more general knowledge of appendicitis among parents now than formerly.—*Boston Medical and Surgical Journal.*

A CASE OF CONTRACTURES FOLLOWING EPIDEMIC CEREBROSPINAL MENINGITIS IN A BOY OF TEN YEARS.*

BY HOWARD CHILDS CARPENTER, M.D.,
Assistant Pediatrist to the Philadelphia General Hospital.

N. C., ten years old, was admitted to the Philadelphia Hospital on September 9, 1907.

Family History.—Father died of unknown causes. Mother, three brothers and one sister living and well. One brother dead, cause unknown. A paternal aunt died of tuberculosis fourteen years ago. A boarder with tuberculosis lived with patient's family for several months before child became ill. This man was very careless, expectorating about the house.

Previous Personal History.—Patient's birth was normal. He had always been well, with the exception of chicken-pox when quite small. He has had no other disease, but had right arm broken, the result of being pushed down a cellar.

History of Present Condition.—On April 12, 1907, he was sent to the Municipal Hospital, then five days ill with epidemic cerebrospinal meningitis. The child survived a virulent attack of this disease. During its course he became totally blind, absolutely deaf, and partly paralyzed on the left side. While in the Municipal Hospital his hearing recovered, and was succeeded by hyperacuteness of audition; later the hearing returned to normal. His vision returned in part, so that he could see a little from both eyes. Following the paralysis, contractures occurred in both lower extremities, and in the left arm. He was admitted to the Philadelphia Hospital on the one hundred and fifty-fourth day of the meningitis.

Examination on Admission Follows:—Rather emaciated colored male about ten years of age. Mentality is fair. Memory is poor. Head is fairly large. He has a linear scar one and one-quarter inches long on forehead, pointing toward left inner canthus (result of being "runned over" by a trolley car). There are a number of scars at right elbow, the result of fracture and probable subsequent necrosis of bones of joint. The pupils are dilated and irregular, the left being larger than the right. The reaction to light in the right is feeble. There is no pupilary reaction to light in the left. Leukomatous areas in both eyes. Sclerotics are muddy white in color. Tongue is moist, anemic and coated with a yellowish-white material. The teeth are large and in fairly good condition. The pulse is small, regular and of moderate rate. The chest is long and narrow. Expansion is more full on right than left. Costal angles are very sharp. Breath sounds are clear, and there are no râles. The heart sounds are slow and regular. Myocardial tone only fair. No murmurs audible. The abdomen is somewhat retracted, the liver does not come below the costal margin, and is slightly enlarged upward. Spleen not palpable. There are marked contractures of the legs, with areas of ulceration due to approximation of the various skin surfaces. The legs are drawn up in a state of flexion. Macewen's sign is present, and is most marked on the left side.

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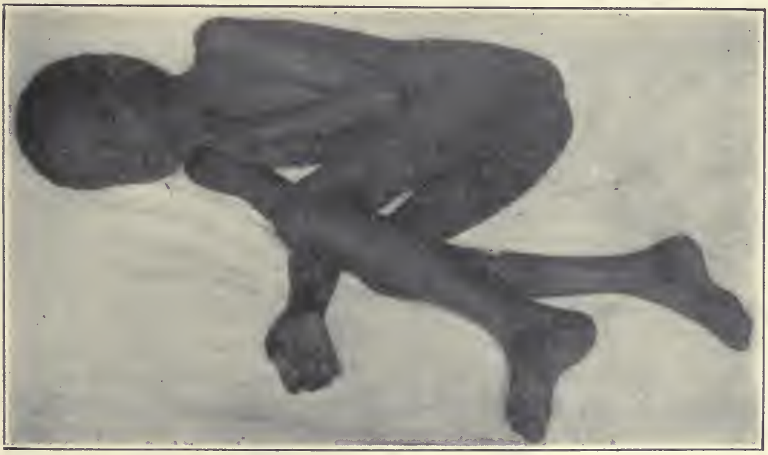
* Read at the Meeting of the Philadelphia Pediatric Society, held June 9, 1908.



A Case of Contracture following Cerebrospinal Meningitis.

During the nine months he has been in the Philadelphia Hospital his condition has changed but little. His eyesight cleared up rapidly, but the contractures have not been lessened to any great extent thus far by treatment. His general nutrition has improved, and the ulcerated areas on the knees and ankles have entirely healed. The patient's temperature has remained normal, his pulse varies from 100 to 110, and his respirations average 25.

Physical examination at present date is as follows:—

An emaciated colored boy, who lies on his left side with both thighs flexed on abdomen, and legs flexed on thighs. The left elbow is flexed, and also the fingers of the left hand. His subcutaneous adipose tissue is scanty. The skin is dry, but free from eruption. The head is somewhat oval in shape. The facial expression is fairly intelligent; he answers questions promptly and without hesitation. The left side of the face is slightly larger than the right, but there is no facial paralysis.

Eyes.—There is a scar over the right eyebrow, and a small cyst on the left upper eyelid. On both eyes there are small leukomas. The conjunctiva, orbital and palpebral are congested, both eyes showing a distinct capillary network. The pupils are equal and react, but reaction is sluggish to light. The extra ocular movements are good. There is slight nystagmus on lateral motion. No exophthalmus or ptosis.

The lips are pale, the teeth are irregular, but not carious, and the gums are inflamed. The tongue is coated with a whitish fur, the papillæ being prominent. The tongue is protruded slightly to the left, but he can voluntarily move it to one side, as well as to the other. The mucus membranes are pale. The palate is high, the tonsils are somewhat enlarged, the uvula quite long, and there is hypertrophy of the lymph follicles of the pharynx.

The thyroid gland is large, measuring 5½ cm. across. The right lobe is 3½ cm. long, and the left lobe is 4 cm. long. The submaxillary glands are split pea in size, as are also the inguinal glands; while the cervical, supraclavicular, axillary and epitrochlear glands are not enlarged. The chest is somewhat flat, with depressions above and below both clavicles. The left side anteriorly is more prominent than the right. At the level of the nipple line the left side of the chest is 1½ cm. larger than the right. This prominence is most marked just to the left of the lower portion of the sternum. Posteriorly there is a slight depression of the spines of the dorsal vertebræ. The scapula are slightly winged.

Heart.—There is slight bulging of the precordium. The apex beat is seen in the sixth interspace, ½ cm. inside the midclavicular line. Pulsation is visible over an area 3 cm. in diameter. No thrill is felt. Cardiac dullness begins above at second rib, and extends as far to the left as the midclavicular line, and to the right as far as the right parasternal line. On auscultation the heart sounds are clear, rapid, regular and of fairly good quality. No murmurs at apex, but at the base there is a functional systolic murmur. There is no accentuation of the second sound. The pulse is regular, small in volume and slightly accelerated.

The Lungs.—Pulmonary expansion is slight. The type of breathing is mostly abdominal. Tactile fremitus can be felt best on the right side, posteriorly this same difference is even more marked. No glands can be felt in the supersternal notch on deep palpation. There is no tenderness over the dorsal vertebræ. On auscultation both inspiration and expiration are heard loudest at the right apex anteriorly and posteriorly, with slight prolongation of expiration. Spoken and whispered voice are much more distinctly transmitted at the right apex than at the left apex. No râles. On percussion there is slight impairment of resonance at the right apex anteriorly and posteriorly. Over the rest of the lungs pulmonary resonance is normal.

The Abdomen.—The abdomen is rounded, on a level with the lower margin of the ribs. The lower half is slightly more prominent than the upper half. The lower half of the abdomen is more resistant to palpation than the upper. A number of small fecal masses can be felt in the cecum. No enlarged glands can be palpated. On percussion the area of gastric tympany is normal. The liver extends from the fifth rib above, to the margin of the ribs below. The spleen cannot be palpated.

The spine is normal.

Upper Extremity.—The left arm is contractured. It is held close to the side of the body by a contraction of the pectoral muscles. There is some limitation of motion at this shoulder joint, and there is also restricted motion at left elbow. This contracture can be nearly reduced by force, while the contraction of the fingers on this hand may be corrected with ease. The biceps jerk is double plus. There is clonus at the left wrist joint. The left arm is wasted more than the right. The right arm measures 15 cm., and the left 13½ cm. The right forearm measures 15 cm., and the left forearm 14 cm. There is wasting of the interosseous muscles, and also of the thenar and hypothenar eminences of the left hand.

Lower Extremities.—Both thighs and legs are contractured. The right more than the left. There is limited motion at both hips; flexion is good; extension poor; adduction good; and abduction slight. The knees which are contracted can be partially reduced by force. The knee joints look large and the skin over them is glossy. Increased reflexes at knees and ankles most marked on the right side. Ankle clonus is present on the right side. There is limited range of motion in both ankles, but slightly more resistance in right than left. There is planter flexion of toes on right, but very little movement in any direction on left to stimulation of the sole of foot. Voluntarily the legs can be extended only slightly. The left thigh measures 21½ cm., and the right 23½ cm. The left leg 16 cm., the right leg 15½ cm. The circumference of the left knee at its largest part is 28 cm., the right knee is also 28 cm.

The cranial nerves are normal. Sensation for heat, cold, touch and pain is normal. The astignostic sense is good. Control of bladder and rectum normal.

Examination of the ears by Dr. Ralph Butler shows the hearing to be normal:—

A.D. A 7/7 Ac > Bc $\underline{\underline{A}}$ 4″ C_4 well. Galton .5. Politzer — Bcn whisper normal.

A.S. A 7/7 Ac > Bc $\underline{\underline{A}}$ 5″ C well. Galton .5. Politzer — Bcn whisper normal.

Both drumheads slightly milky, otherwise normal. Little cerumen in left.

Skiagraph of knees shows roughness of epiphyses of femora; tubercle of tibia prominent. Four chemical examinations of the urine were made; the specific gravity varying from 1.012 to 1.020. On two occasions a trace of albumen was present, with a few leukocytes, epithelial cells from bladder, and uric acid crystals, but no tube casts were present. The urine was examined twice for tubercle bacilli; both examinations were negative.

Dr. Rosenberger reported that no tubercle bacilli were demonstrable in the feces.

On June 2d I examined the blood, with the following result: Hemoglobin, 75 per cent., red blood corpuscles, 3,937,200, and white blood corpuscles, 12,560. The differential leukocyte count showed: Polymorphonuclears, 62 per cent; large mononuclears, 8 per cent.; lymphocytes, 25 per cent.; transitionals, 4 per cent.. and eosinophiles, 1 per cent.

Patient gives a positive Von Pirquet tuberculin reaction (double plus), and also a positive Moro tuberculin ointment reaction (single plus).

The pathological diagnosis, which best explains the physical signs in this case, is that of an old placque of meningitis in the upper cervical region on both sides, but especially on the left side, infiltrating and involving the pyramids. The boy also has a suspicious tubercular infiltration of the right apex.

OTITIS MEDIA PROPAGATA. MUCO-PURULENT AURAL DISCHARGE DUE TO NASAL CATARRH.

BY PERCY FRIDENBERG, M.D.,

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Text-books on otology justly devote much space to the important subject of purulent otitis media, and to the acute nonperforative middle ear catarrh, and numerous papers and clinical lectures have familiarized the student as well as the general practitioner of medicine with the dangers of mastoid involvement and the measures for its prevention. There is, however, another form of middle ear catarrh which has not had the attention it deserves, and while fraught with less serious danger to the patient by involvement of the mastoid and temporal bone is, to my mind, of practical importance on account of its frequency in children, especially in the late winter and early spring months, its mild course, tendency to chronicity and to relapse, the possibility of its being confounded with a type requiring surgical intervention, its intractability to local measures, and its prompt relief and speedy cure by treatment directed to the nasopharynx. Comparatively little has been written about this form of middle ear catarrh with mucoid discharge, although the rôle of nasopharyngeal disease, more particularly adenoid hypertrophy, in purulent otitis, is often referred to, and the advisability of removing such growths during or after operation on the mastoid discussed. The type of catarrh to which I refer might be styled "propagated," or "transmitted," drainage catarrh, as it depends primarily on a secretion or accumulation of muco-pus in the posterior nares, and possibly in the Eustachian tube, and its discharge from the middle ear through a generally spontaneous perforation of the drum. This process is characterized by its comparative frequency in children as an acute catarrh; its tendency to diminish or cease entirely under conditions favorable to a diminution or cessation of the morbid secretion in the posterior nares, its recurrence with every cold in the head, and more particularly with acute disease, such as measles, chicken-pox, scarlet fever, influenza, bronchopneumonia, which are associated with congestion of the fauces and pharyngeal vault. As a result there is chronicity with more or less prolonged intervals of apparent cure, and the latter factor is responsible for the appearance of the discharge, seemingly *de novo,* in adults with mucopus in the nasopharynx, due to adenoids, posterior turbinate hypertrophies, or accessory sinus catarrh. The persistence of the aural discharge in such cases is not uncommonly a cause of their being mistaken for, and surgically treated as, chronic purulent otitis media, although, as a matter of fact, actual pus production with progressive bone involvement occurs only under exceptional conditions, notably secondary infection, to be mentioned later. The clinical features are strikingly uniform. The first symptom is often the appearance of a stringy, pale yellow or glassy, transparent, mucoid or mucopurulent, not infrequently bilateral, discharge from the ear, after a variable period of snuffles, obstructed nasal respiration, and consequent mouth breathing. There is, as a rule, no marked systemic disturbance, fever, or earache, even prior to perforation, affording a rather decided contrast to the picture of restlessness and suffering in acute otitis media purulenta in children. The discharge is often copious, and the quality far in excess of the amount which could be produced in the middle ear in the length of time allotted. Such a condition, in purulent otitis media, is an indication of pus production in accessory cavities, antrum, mastoid cells, and so on, and it can be explained similarly in these cases, I think, as a postnasal catarrh draining by way of the middle ear. This hypothesis, as will be shown later on, is supported by the prompt results of nasal treatment, which, with the palliative effect of syringing and ear drops, would lead us to infer that there is little or no involvement of the accessory cavities of the middle ear. The benign character of the discharge seems to be proven by the slight tendency to bone involvement, the absence of marked inflammatory reaction in the middle ear, and the fact that there is little, if any, constitutional disturbance. There is little reparative reaction, either, as shown by the fact that the perforation in the drum membrane rarely heals in these cases. This is probably due, in no small measure, to the frequent recurrence and to prolonged and copious discharge, the glairy nature of which may have some tendency to devitalize the cells at the edges of the perforation.

This is rather a contrast to the results of acute purulent otitis, in which, if we exclude the cases due to scarlet fever and diphtheria, the perforation usually heals promptly unless there have been complications, an unduly protracted course, or some general diathesis, such as tuberculosis or syphilis. The absence of pain is due to the mild reaction in the middle ear, the early occurrence of spontaneous perforation, and the favorable conditions of drainage afforded by an opening which shows no tendency to become occluded and generally remains patent. Warm irrigations of the ear with mild solutions of bichlorid or boracic acid sometimes appear to bring about a cure, but the aural discharge recurs with every cold, and at times even without this evident cause. Astringent solutions, such as zinc sulphocarbolate 1 to 2 per cent., have a more lasting palliative effect, but a cure is rarely effected by local treatment of the ear. If the source of the discharge is attacked directly, however, and in children this means the posterior nares, by applications of silver nitrate, 5-20 per cent.; resorcin-alcohol, 50 per cent.; iodin-glycerin, 10-25 per cent., and removal of adenoid hypertrophies whenever present, the aural discharge is promptly cut short, and recurrence, as a general thing, effectually prevented. In some cases there is marked impairment of hearing, even during the periods of partial or complete freedom from aural discharge, and these cases are unusually amenable to the local nasal treatment just outlined, combined with inflation of the middle ear with menthol-iodin vapor. Reference has been made to the confounding of these cases with purulent forms of otitis requiring operation. The diagnosis may be obscured by pain, fever and pus discharge, all absent in uncomplicated cases, and generally due to lack of free drainage, causing stagnation and decomposition, and to secondary infection with virulent micro-organisms either by way of the external auditory canal, or more probably and frequently from the nasopharynx by way of the Eustachian tube. In this way the secretion may change to a frankly purulent, or even fetid, discharge, simulating bone destruction and a true otitis with progressive involvement of the mastoid and temporal bone or of the ossicles and attic, may be engrafted on the original comparatively benign affection, an added reason for early treatment of the nasopharynx, whether medicinal or surgical. During the last few years I have observed a rather large number of these cases, and, in several of them, pain, diminished hearing, occasional headache and dizziness, and long-standing discharge had led competent otologists to suggest the advisability of a radical mastoid operation. It is far from my intention to belittle the value of this often life-saving procedure, or to suggest that it is not necessary in many cases, but it seems to me that the type of catarrh which I have described, and of which I see a good deal during the winter and early spring months, mostly in children, but not at all exceptionally in young adults, should be more promptly and generally treated by the conservative, but quite effectual and sufficient, means which I have outlined, viz., removal of the source of infection in the posterior nares, nasal cavities or accessory sinuses, by appropriate means, whether medicinal or operative.

OBSCURE FEVER IN INFANCY AND EARLY CHILDHOOD.—J. L. Morse (*Boston Medical and Surgical Journal,* July 9, 1908) says that a daily rise of temperature above 99.5°F. at the age referred to is abnormal, and is a manifestation of some diseased state. Among the conditions which give rise to it he includes endocarditis, typhoid fever and malaria, starvation in the newborn, dentition, toxic absorption from tonsils and adenoids, otitis media (a most common cause), cervical and bronchial adenitis, anemia, rachitis, syphilis, intestinal toxemia, etc. Finally, he says that there is a class of cases of continued fever in infancy and early childhood in which the most careful examination fails to find any cause for the fever, in which no modification of the diet is of any avail, and in which the general condition is unaffected by the child being apparently well and gaining normally in weight. The temperature may remain normal for many weeks, or even months, in such cases, and finally cease, without any cause for it ever being discovered. In these cases the most reasonable explanation is, in the author's view, some obscure disturbance in the bodily metabolism. The history of such a case is thus portrayed: A girl of two years had a slight cold, lasting about a week. The temperature, which was first taken during the cold, did not drop when the child recovered, but continued elevated. It ranged between 100°F. and 101°F. in the morning and 102°F. and 104°F. in the afternoon for eleven months, finally coming slowly down to normal and remaining there. During this time she appeared perfectly well in every way and gained steadily in weight and height. Repeated examinations failed to show anything abnormal. She is now, four years later, an exceptionally large, strong and healthy girl. Such cases justify the conclusion that if a careful study and thorough examination of the child does not reveal the cause of the fever, there is, in the vast majority of cases, nothing serious the matter, and no cause for anxiety.—*Medical Record.*

DIPHTHERIA FOLLOWING TONSILLECTOMY AND ADENECTOMY.

BY IRA S. WILE, M.D.,

Clinical Pathologist, Children's Department, Vanderbilt Clinic, New York.

The appearance of a diphtheritic exudate after tonsillectomy is so usual that its non-appearance would be worthy of comment. This exudate, while simulating true diphtheria, is not caused by B. diphteriæ. To quote Holt, "the appearance of the tonsils, on the second or third day after tonsillectomy has been performed, may easily be mistaken for diphtheria by one who is unfamiliar with the appearance of the wound." That familiarity with this wound should not exclude suspicion of diphtheria, the case to be reported gives silent testimony.

In what proportion of post-tonsillectomy exudates are Klebs-Löeffler bacilli found? Possibly it is wiser to ask how frequently is a culture made from such a membranous exudate? The following case presents its own lessons:

B. W., age seventeen, single, English, schoolgirl, strong, robust, well nourished. Voice nasal. Only complaint persistent cough for two or three years, worse during the winter time. Lungs negative save for few râles disappearing after coughing. Tonsils chronically hypertrophied, projecting out from the fauces. Pharyngeal wall, pale, streaked with greyish mucus. Adenoids present. Tonsillectomy and adenectomy advised. Patient referred to a special clinic for eye, ear and throat. Diagnosis and treatment confirmed the following day. Two days later B. W. was etherized at 3 P.M. and tonsils, adenoids and part of uvula removed. The following morning (Sunday) at nine o'clock, B. W. went home. It is reported that her mouth temperature was practically normal.

Arriving home she went to bed. Nausea and vomiting continued so that nourishment could not be retained. Odor of ether was noted on her breath for at least twenty-four hours. Throat felt sore. Breathing through nostrils labored. Condition so wretched the foster mother, herself a physician no longer in practice, telephoned to the hospital at which B. W. was operated upon and asked if such sore throats were usual. The information was given that the throat would be very sore for four or five days, that the throat and nose should be kept cleansed with a solution supplied by the hospital..

The next day (Monday) the throat was so sore that swallowing was possible with difficulty; the nose barely gave air passage. At this time the writer first saw the patient. The patient was still vomiting. The cough was increased in frequency and created nausea followed by vomiting. Rectal temperature 101° F., pulse 110, good volume and tension. A diphtheritic exudate reached from fauces to fauces. The slough was greyish green with a rosy line of demarcation. Nasal breathing very difficult but no nasal discharge. The pharyngeal wall was hyperemic and with a few small areas of exudate as though there had been denudation of the mucous membrane in spots. No glandular enlargement. No odor. Patient bright, feels strong. Bowels had been opened by enemeta, urine plentiful. There was hypersecretion of mucus. Deglutition painful.

Diagnosis—A post-tonsillectomy exudate (Tuesday). Throat somewhat easier, painless. Patient wanted to get up. Exudate in throat appeared to be lessened. The remaining membrane appeared granular and seemed friable. Nose was occluded but no discharge was present. No excoriation about alæ nasi. No adenitis. Bowels moved. Urine moderate in quantity. Temperature 102° F., pulse 120. Could take a little nourishment. Hypersecretion of mucus somewhat relieved. No chills. No sweats.

Diagnosis—Secondary streptoccic infection. (Wednesday.) Had to breathe through mouth all night. The accumulation of mucus induced a sleepless night. Nose occluded. Applicator was passed through nostrils without causing bleeding. Throat felt very sore again. Night temperature 104° F., pulse 120. Small amounts of nourishment retained. Bowels moved. Throat showed a slight spread of granular exudate on pharynx. Communication with the hospital where the operation was performed determined that if there was no improvement during the next twenty-four hours, *i.e.*, during the fifth day the patient should return to the hospital.

(Thursday.) Temperature 102° F., pulse 120. Exudate was lessened upon the fauces. Patient complained of the sensation of a lump back of the nose from which the mucus was falling and irritating her so as to cause a frequent though less constant cough. The eyes were dull and patient looked septic. The exudate was distinctly granular, appearing like small separate colonies studding the pharynx. The nose was more open. There was no free nasal discharge save on blowing the nose. The nasal mucus was not blood-tinged, nor was it odorous, nor did it excoriate the nostrils. Slight edema of throat was present. Patient felt exhausted. Deglutition very painful. Vomiting occurred after severe attacks of coughing. No adenitis noted.

(Friday.) The edema of throat was increased. For the first time enlargement of the glands of the neck was noted. As arranged the patient was transferred to the hospital. The temperature was 100.4° F. (by mouth) and 102° F. (by rectum), pulse 120, poor tension. Eyes dulled, facies septic. Voice husky. Exudate found on fauces, pharynx, in nose almost to tip, and a few whitish colonies on the gum anterior to and below the inferior incisors. There was a small ulceration of the gum at base of left lower second molar tooth. Odor was absent. Hypersecretion of mucus continued.

The clinical diagnosis of the house physician and consulting physician agreed with that of the writer that the case was one of streptococcic infection of an exudate following tonsillectomy and adenectomy.

Culture was deemed advisable as matter of hospital caution. The report on this was positive, *i.e.*, B. diphtheriæ were present.

(Saturday.) The patient was immediately transferred to Minturn Hospital; 10,000 units of antitoxin had been given early in the morning; 10,000 units more were given without any appreciable effect. The nasal growth did not resemble a true membrane, but showed a highly erythematous swollen base studded with a whitish granular deposit. The same sort of an exudate covered the pharynx and invaded the larynx. Edema of throat increased. Submaxillary and cervical adenitis became very marked.

The urine, examined by Dr. Carrick, showed albumen, hyalin and granular casts in profusion, leukocytes, red corpuscles, epithelium. Toxic nephritis.

(Sunday.) Twelve thousand more units of antitoxin were given, but without the slightest effect. There was no evidence of separation of any part of the exudate. Toxemia was profound. Cardiac weakness came suddenly and stimulation failed to overcome the cardiac depression. Pulmonary edema was temporarily relieved. A second attack of cardiac depression ended the suffering. Consciousness continued up to within two hours of death.

It is noteworthy that fetor was lacking until the very end. A culture from the throat, taken just before death, was examined by Dr. Carrick who reported the presence of B. diphtheriæ and streptococci.

Dr. McKenzie, at Minturn, did not regard the case as presenting the clinical appearance of true diphtheria. His first impression was that there was a diphtheritic exudate following tonsillectomy, probably due to secondary infection by streptococci.

In considering the above case several questions arise which I shall not attempt to answer but merely offer as suggestive queries.

Were B. diphtheriæ present in the throat at the time of the operation, waiting for the wounded surfaces to afford opportunity for growth?

Was the throat infected at the time of and by the operation?

Was the exudate secondarily infected after operation?

Should a throat culture be made as a routine measure before operations upon the throat?

Should a culture be made as a routine measure from exudates following operations upon tonsils and adenoids?

The last two questions require solution as the cultures may serve to save some life in the future. The case teaches the necessity of suspecting the existence of true diphtheria in post-operative exudates. The value of culture for B. diphtheriæ is again emphasized. The clinical history and appearance of the exudate led to an incorrect diagnosis. The culture alone made the correct diagnosis of diphtheria following tonsillectomy and adenectomy.

2493 Broadway.

Acute Hemorrhagic Nephritis, after Mumps, in a Seven Months' Old Infant.—Jelski (*Arch. f. Kinderhk.*, Vol. XLVII., page 164) reports the case of a seven months infant who had a moderately severe parotitis. Two weeks after the onset it was noticed that there were bloody specks on the diaper. Examination of the urine showed the picture of an acute hemorrhagic nephritis. Despite energetic treatment the child died with a picture of uremia. Careful search of the literature showed the author that the cases of nephritis following mumps in childhood have occurred in older children. It is noteworthy that three other children in the family, who had mumps at the same time, showed no complications.—*Interstate Medical Journal.*

SARCOMA OF THE KIDNEY.*

BY C. C. RUSH, M.D.,

Philadelphia.

The case which I have been asked to report is that of an Italian baby of nine months, who was brought to the University Hospital in the service of Dr. Griffith on August 13, 1908, with the history that the parents had noticed for the two weeks previous that the abdomen was large and that the child seemed to be tired and sleepy.

Examination showed a somewhat emaciated and rachitic baby, with a slight mucopurulent discharge from the left eye, with indefinite signs of bronchopneumonia, with moderate enlargement of the superficial lymphatics, and with a distended abdomen containing a tumor to the right of the mid-line.

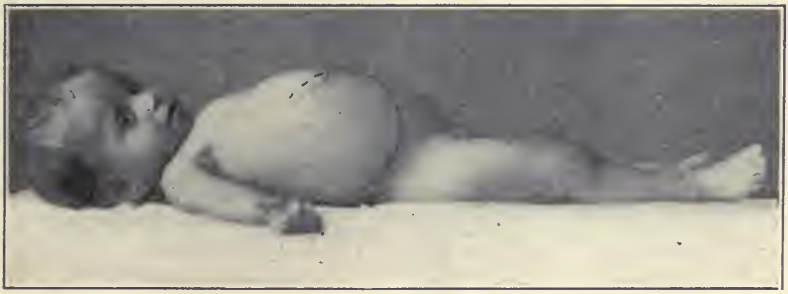

Fig. 1. Showing Abdominal Extension. Edges of Liver and Tumor Mass Indicated by Lines on Skin.

The tumor was firm, smooth in outline, except on the inner side, and extended from the crest of the ilium below to a point well beneath the ribs above. It appeared to occupy completely the space between the anterior and posterior walls on the right side. The tumor caused no anterior bulging of the abdomen, but there was marked lateral bulging. Posteriorly the fingers could be inserted between the mass and the spinal column. (Fig. 2.)

The liver was enlarged, extending 9 cm. below the ensiform cartilage. Its free edge could be made to move upon the more firm underlying tumor. There was no ascites and the spleen was not enlarged. Four examinations were made of the urine, all of which showed acidity and the presence of albumin. No sugar was present. There were hyalin, pale and dark granular, leukocytic and blood casts. In 2 examinations the leukocytes were increased in number and red cells were present. One examination showed a large number of epithelial cells from the pelvis of the kidney.

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* Read before the Philadelphia Pediatric Society, October 13, 1908.

On admission the blood showed 35 per cent. of hemoglobin and 11,400 leukocytes, with a differential count of:—

Polymorphonuclears	62 per cent.
Lymphocytes	24 " "
Large mononuclears	12 " "
Transitional cells	2 " "

Examination of the pus from the eye showed pneumococci.

The cutaneous test for tuberculosis was negative.

The stools were frequent and contained green mucus and a few soft curds.

At first the temperature varied from 102° to 104° F.; the respirations ranged from 48 to 60; the pulse averaged 140. In fifteen days the fever fell by lysis. The highest leukocyte count during the course of the pneumonia was 13,100. After recovery from the pneumonia the count dropped to 9,000.

After the patient had been in the hospital a few days the tumor seemed to be a little larger; afterward it felt smaller, and appeared to vary somewhat in size from time to time.

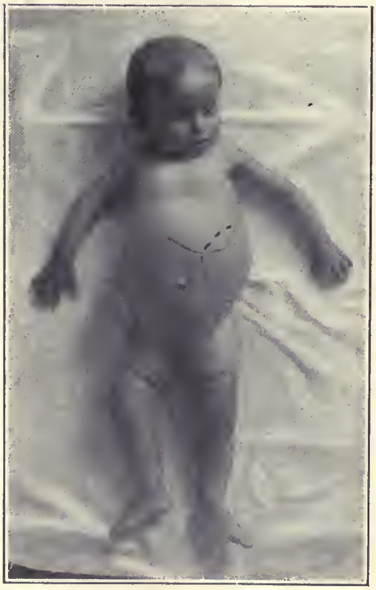

FIG. 2. Taken by Reflection which Causes the Tumor to Appear on the Left Side. The Dotted Line shows the Extension of the Tumor Underneath the Lower Edge of the Liver.

On September 25th, the hemoglobin having been raised to 50 per cent., an operation was undertaken. An extraperitoneal incision was made and the tumor, which was found connected with the kidney, was removed. The child died two hours after the operation.

The following pathological report was made:—

"The mass measures 12 x 10 x 5 cm. The external surface is nodular and the thin capsule is easily stripped. The cut surface of the tumor reveals a large round tumor mass and a portion of the atrophied kidney.

"The kidney is seen to be separated from the tumor tissue in a few places by a distinct capsule. The tumor is soft in consistency and presents areas which are dark red in color. In the center is a large mass of yellowish necrotic material. The growth is devided into distinct lobulations by bands of rather thin fibrous tissue.

"On microscopical examination the sections from the yellowish areas show nothing but necrosis. The red areas show tumor tissue of a malignant growth of the small round cell connective tissue type.

"Examination of the kidney structure shows some degeneration of the gland epithelium, compression and atrophy of the tubules and the glomeruli appear atrophied."

University Hospital, October 13, 1908.

CASTS OF INFANTS' STOOLS.—R. Gaultier presented at the meeting of the Paris Pediatric Society, May 19, a collection of casts, reproductions of the stools of infants. Each was accompanied with a label describing the type: the meconium of the newborn; the normal stool of the breast-fed infant; of the child on sterilized milk; of the child with mucous enterocolitis; with acute bilious gastroenteritis, and the white stools of chronic gastrointestinal dyspepsia. The description noted also the number of stools in the twenty-four hours, the typical tint, quantity, aspect and consistency, odor, reaction, and microscopic, chemical and bacteriologic analysis, with the dietetic measures which each type should suggest. He thinks such casts would prove valuable for students, midwives, nurses and mothers, if such a collection were installed as an object lesson in children's hospitals, crèches, dispensaries, etc.—*Medical Record.*

ARCHIVES OF PEDIATRICS.

NOVEMBER, 1908.

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INFANTS' MILK DEPOTS IN THE CAMPAIGN AGAINST INFANTILE MORTALITY.

On June 17th the New York Milk Committee opened seven infants' milk depots from which certified milk, modified according to five formulæ in quantities from ½ to 8 ounces, was sold. These depots were under the supervision of trained nurses and volunteer physicians, who instructed mothers in classes similar to the Consultations de Nourrissons in France. No mother was permitted to get the milk until a physician had determined that she was unable to nurse her baby. A prescription was then given her on the condition that she would bring the baby once a week to be weighed at one of the consultations connected with the depot.

The prices asked for the milk ranged from one-half cent to two and a half cents a "feeding." People who were unable to pay all or part of the full price were assisted by the New York Association for Improving the Condition of the Poor and other relief agencies.

The Committee also engaged two nurses to do instructional field work not connected with milk depots. These nurses, like the others, coöperated with physicians who conducted classes or consultations for mothers.

The aim of the Committee, apart from the actual field work, was to find some answer to the following questions:

(1) What are the comparative results obtained by the continued use of pasteurized and of raw milk?

(2) Which is the more economical and satisfactory method of saving infants' lives—the purely educational programme carried on in connection with the ordinary milk supply, or the sale of modified milk dispensed by nurses who also do instructional work?

(3) Can infants' milk depots be run on a business basis, and if not, in how far will philanthropy be needed to support their work?

All the nurses began work on June 1st, personally interesting physicians and securing their services for conducting the consultations. Largely as a result of their efforts 29 physicians are now holding consultations in connection with the depots and in coöperation with the outside nurses. Records of each infant are kept on a feeding chart. A curve of progress is drawn from week to week, which represents the estimated actual condition of the child. In order to assist in making this estimate, a scale of 100 has been adopted as follows:—

Moribund,	from	0 — 10
Bad,	"	10 — 25
Poor,	"	25 — 50
Fair,	"	50 — 65
Good,	"	65 — 80
Excellent,	"	80 — 95
Perfect,	"	95 — 100

The idea of the chart is to indicate graphically the condition the child was in when first brought to the depot and when it left the depot. Record of intestinal disturbances and of illnesses (indicated by a drop in the curve of progress) are made by the physicians and furnish a basis for comparison of the kinds of milk used. Facts dealing with medical and social conditions affecting the life of infants are also kept by the nurses for statistical purposes.

Owing to lack of funds during the summer the milk depot nurses were forced to devote a large part of their time to dispensing milk and rendering accounts. This interfered seriously with their visiting and follow-up work, but this handicap was offset by the fact that, through the sale of milk, they secured a strong "hold" upon mothers for instructional work. Seeing each mother every morning gave them, also, an opportunity to watch each infant, and often to prove that "an ounce of prevention is worth a pound of cure."

The two nurses not connected with depots, on the other hand, devoted more time to home visiting, but retained their "hold" upon mothers with difficulty. The mothers whom they did retain were, as may be imagined, more intelligent than those held by the depot nurses, and consequently obeyed instructions better. These nurses had more breast-fed babies and more babies over one year of age than the depot nurses, which may account for the fact that only four deaths occurred out of 205 babies brought to them throughout the summer. In the raw milk depots 18 babies died out of a total of 446 babies brought to them, and in the pasteurized milk depots 15 babies died out of a total of 338 babies brought to them. Four babies died also who attended the consultations not connected with milk depots. From the facts entered on the record charts, Dr. Pisek has estimated that out of the 37 infants who died in all, the depots apparently were responsible for three deaths, possibly responsible for one death, and not responsible for thirty-three deaths. The three deaths for which the depots apparently were responsible and the one death for which they were possibly responsible were raw-milk babies.

From a nutritional standpoint, the babies fed on the modified milk improved more uniformly and more readily than those fed at the independent consultations. This is shown by the following table:—

BABIES WHO WERE WEIGHED AT CONSULTATIONS, WEEK ENDING AUGUST 31, 1908.

	Pasteurized Milk Stations.	Raw Milk Stations.	Total on Modified Milk.	Independent Consultations.
Gaining	127, 81.4%	120, 73.6%	247, 77.4%	95, 69.4%
Stationary ..	8, 5.1%	23, 14.1%	31, 9.7%	19, 13.8%
Lost	21, 13.5%	20, 12.3%	41, 12.4%	23, 16.8%
	Total, 156	Total, 163	Total, 319	Total, 137

Owing to the shortness of the period of observation, the summer's work has shown practically no difference in the nutritive effects of raw and pasteurized milk. Those who have worked upon the problem, however, are of the opinion that from the standpoint of safety, pasteurized milk is preferable for summer work.

The work of the summer demonstrates that even in the present condition of the milk supply infantile mortality may be reduced through the holding of classes or consultations in which physicians, assisted by nurses, instruct mothers how to feed and care for their babies. The significance of this is briefly, that with no expense whatever for purchasing equipment and modifying milk, any city or organization may definitely save lives through a programme of pure and simple education. But although independent nurses doing purely instructional work can accomplish more than those giving a large share of their time to dispensing modified milk, nurses connected with infants' milk depots, and devoting their whole time to instruction, can, because of the milk and its "hold" upon ignorant mothers, accomplish more than either of the other two.

Whole milk should be sold in conjunction with modified milk in infants' milk depots for the following reasons:—

(1) Because the *exclusive* sale of modified milk discourages breast feeding. (2) Because wherever possible home modification of whole milk is desirable from an educational standpoint. (3) Because the substitution of whole milk for modified milk would mean a big economy to poor mothers and to philanthropists, the latter of whom could devote to educational purposes money which is often spent needlessly on modifying milk.

Viewed from the standpoint of all their activities, infants' milk depots cannot be supported without philanthropic assistance. The best method, in my opinion, would be to sell the milk on a business basis in coöperation with physicians, philanthropists, social workers and the municipality.

The approval of the Academy of Medicine for the general instructional and preventive work carried on in the depots, and the approval of the New York Health Department for each detail in the production, handling and sale of the milk would inspire confidence, secure coöperation and promote the usefulness of the depots.

The price set for the milk should be set by terms of fair competition. Selling milk below cost or below a fair profit not only relieves people indiscriminately and injures legitimate business, but it also creates a false idea of the value of milk, the price of which has been determined by its quality and standard of production. This is bad milk education. Selling milk below cost, furthermore, conceals the actual burden of relief which falls upon philanthropy, and thus fails rightly to inform society about the great problem of under-nourishment. Poor people, who could not afford to pay all or part of the full price should be assisted by relief agencies to whom the milk company would render bills.

The organization of a "model milk company," to coöperate with dairymen and to demonstrate to other concerns the possibility under wise and experienced management of producing a cheap, clean milk, ought to be neither difficult nor costly, provided a regular milk dealer could not be persuaded to undertake the task. Personally, I am of the opinion that milk answering to the requirements of the New York Health Department's newly classified "guaranteed" milk, which is equal in its essential characteristics to certified milk, can be produced at a much lower cost than most people suppose. The attempt to secure this milk, whether successful or not, would be of great educational value.

Last of all, nurses, acting as directresses of the depots, should coördinate the sanitary, medical and social activities coöperating therein. These nurses should be held responsible for the social statistics and the physicians responsible for the feeding statistics of the infants under them. The number of babies should be limited according to the nurse's capacity, measured in terms of efficiency and permanent results.

Such a combination is not only feasible, but in my opinion is the most practicable plan for reducing infantile mortality. By attracting and "holding" mothers through the sale of milk, permanent educational results would be secured. By coördinating all forces interested in babies, isolated effort would be eliminated and the work of all would be enhanced and multiplied. By gathering statistics, and by wide observation, important facts about infant feeding and conditions affecting the lives of mothers and children would be ascertained, and the way paved for a more effective campaign against infantile mortality.

Wilbur C. Phillips,
Secretary of the New York Milk Committee.

Note.—An illustrated report of the Committee's work describing in detail the points above touched upon, and designed to answer any question which may be asked concerning them, will be forwarded to any address on the receipt of 25 cents sent to the New York Milk Committee, 105 East 22d Street, New York City.

Society Reports.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Abstract of Record of Meeting held October 13, 1908.

J. P. Crozer Griffith, M.D., President.

ARTHRITIS DEFORMANS IN AN INFANT.

Dr. J. T. Rugh reported a case of arthritis deformans in an infant whose birth was normal and family history negative. The child was breast-fed; teething was normal; walking began at nine months. At six weeks she had pertussis; at sixteen months she was weaned and has never had any stomach trouble. Stiffness of the neck was noticed in June, 1907; the wrists became enlarged in January, 1908. In February, 1908, she fell to the floor and has not walked since. Now the phalanges of hands and feet, the ankles, knees, shoulders and spine are involved. Fingers are in slight flexion, as are the elbows. The child is much thinner than formerly, but her general health is fairly good. Development proceeded normally and there is marked absence of any etiological factors. The child was placed upon tincture of iodin and has shown considerable improvement.

DOUBLE SUPPURATIVE PAROTITIS COMPLICATING TYPHOID FEVER.

Dr. Howard Childs Carpenter presented a boy of eleven years, who developed parotitis on the left side on the seventeenth day of a severe typhoid, and twenty-four hours later on the right side. Both sides became greatly swollen, with extensive inflammation of the tissues surrounding the parotids. Both glands were incised and continued to discharge pus until the fifty-first day, when both wounds completely healed.

Dr. Alfred Hand, Jr., and Dr. J. P. Crozer Griffith said that they had never before seen such a case.

EDEMA NEONATORUM.

Dr. Carpenter reported this case. The infant was born with edema of the thighs, scrotum, suprapubic region and the lower half of the abdominal wall. The urine was normal and the heart negative. There was a blood count of 50 per cent. hemoglobin and 2,839,000 red corpuscles. It also had symptoms of hereditary syphilis.

Dr. Griffith and Dr. A. H. Davisson discussed this case. They did not believe that this case could have been sclerema, as both the induration and the discoloration were wanting.

DOUBLE CONGENITAL LUXATION OF THE HIPS.

Dr. A. P. C. Ashhurst, on behalf of Dr. G. G. Davis, presented a girl, aged two and one-half years, with double congenital dislocation of the hips. She came under the care of Dr. Warren Walker in the Dispensary of the Children's Hospital in February, 1908. Being admitted to the wards, in the service of Dr. J. P. Hutchinson, Dr. G. G. Davis was called in consultation, and on February 28, 1908, when the child was just two years of age, Dr. Davis successfully reduced both dislocations by his method of forward pressure on the trochanters, while the patient lay prone the thighs flexed to 90° and abducted as far as possible. The patient's lower extremities were put up in plaster casts, in the so-called "frog position," and in spite of an attack of diphtheria, during which the child was in the Municipal Hospital, she did well; the cast was changed at suitable intervals, the position of the thighs being gradually altered to the normal and the use of a cast was discontinued six weeks ago, about September 1, 1908. Since that time the patient had been walking about, normally. When examined at present the gait was seen to be natural for a child of less than three years; the marked lordosis present before the dislocations were reduced had disappeared, and the heads of the femurs could be felt in their normal position below Poupart's ligament. Skiagraphs made before reduction were shown, as well as one made on the day the patient was exhibited to the Society, showing the heads of the bones in the acetabulum.

Dr. Rugh and Dr. E. B. Hodge thought this a remarkably good result considering the short time since operation.

CONGENITAL HYPERTROPHIC STENOSIS OF THE PYLORUS.

Dr. W. N. Bradley, after detailing a complete review of the history, symptomatology, etiology, morbid anatomy and treatment of congenital hypertrophic pyloric stenosis, reported the case of a child of four weeks, who had been breast-fed for three weeks. On the seventeenth day of life, vomiting began and became continuous. The bowels were constipated. The child was admitted to the Children's Hospital when thirty-one days old. Operation was performed one week later by Dr. E. B. Hodge, but the infant died the next day.

Dr. Hodge said that medical treatment had been tried for a few days after admission to the hospital. As there continued to be progressive loss of weight, with vomiting, constipation and visible peristalsis of the stomach, operation was undertaken. At no time was a mass palpable. At operation the enlargement of the pylorus was typical and marked. A Heineke-Mikulicz pyloroplasty was done. On account of the friability of the fibrous tissue the stitches repeatedly tore out and considerable time was lost before the suturing was completed. Time of operation was forty minutes. Most of the operation was performed without anesthesia. The child was in fair shape after operation, but died after twenty-four hours. In another case presenting as much thickening of the pylorus, Dr. Hodge would do gastroenterostomy, reserving pyloroplasty for cases with less thickening and hardening of the pylorus.

Dr. J. C. Gittings said that recently he had seen a case in which the diagnosis of hypertrophic stenosis of the pylorus seemed most probable because of the fairly typical history and the occurrence of reverse peristalsis across the epigastrium. At autopsy, two days later, a greatly distended colon was found overlying the stomach, while an anomalous right-sided sigmoid lay directly below it, passing from the splenic flexure transversely across the epigastrium to a point just below the hepatic flexure and then diagonally downward to the left side of the pelvis. It was the normal peristalsis in this high-placed, right-sided and distended sigmoid that had been seen above the umbilicus.

Dr. E. E. Graham said that, in the cases which should be called congenital, symptoms occurred soon after birth. These cases run an acute course, with marked symptoms, with a good prognosis, because they come to operation early. The diagnosis may be made without any tumor being found. He had seen an infant six weeks ago, with symptoms dating from birth. Operation was performed on the thirteenth day of life and the child lived for ten days after gastroenterostomy. Dr. Graham has a surgeon see such cases early whenever possible.

Dr. J. J. Gilbride had reported a case in a child of seven weeks, in which a tumor was palpable. Operation was refused and the child died three days after being seen.

Dr. Hand commented on the rarity of such cases in Philadelphia, and he does not believe that they are overlooked. Cautley's series of specimens demonstrated in Toronto two years ago convinces him that the condition is congenital.

SARCOMA OF THE KIDNEY IN AN INFANT.

Dr. C. C. Rush, by invitation, reported this case. (See page 857.)

Dr. Griffith said that he had seen a great number of tumors of the kidney in young children, and all that had been operated upon died, either right after operation or from recurrence.

Dr. Bradley said that he had seen 2 cases of sarcoma of the kidney in children, one of which at autopsy weighed 20 pounds. In this case only one kidney was present.

Chronic Appendicitis in Children.—J. Comby (*Le Bull. Mèd.*, June 10, 1908) finds that appendicitis in children is comparatively frequent, and is essentially a chronic disease which may have existed for a long time with insignificant and vague symptoms before the acute attack caused a diagnosis to be made. It occurs in well nourished children who have a hereditary predisposition to the disease, and in cachectic children who have been subject to intestinal and gastric troubles all their lives. Another class of patients is that in which adenoids, tonsillitis, and nasal troubles, with enlargements of the cervical glands are frequent. It is frequently associated with cyclic vomiting and mucomembranous colitis. The chief symptoms are indigestion, lack of appetite, pains in the abdomen, and constipation. Intestinal catarrh may exist instead. Infectious diseases are very apt to cause attacks of appendicitis. The differential diagnosis has to be made from enterocolitis, hepatic and renal colic, movable kidney, and dysmenorrhea and ovarian troubles in young girls. Many surgeons claim that an operation in the interval is demanded in all cases. For the milder cases rest, attention to the diet, and to the bowels is in order, as some cases become cured by sclerotic changes.—*Medical Record.*

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. A. W. BINGHAM.
DR. E. C. FLEISCHNER. DR. G. R. PISEK.
DR. HENRY HEIMAN. DR. S. W. THURBER.

PATHOLOGY.

MENDELSOHN, S.: HEMORRHAGE INTO THE THYMUS. (*Archiv. für Kinderhk.*, Bd. 44, p. 1.)

Mendelsohn reports a case of hemorrhage into the thymus, in a child three hours old, with congenital syphilis. The patient died in the hospital and the autopsy showed the thymus to be as big as a pigeon's egg. It weighed 8.7 grains. In the right lobe of the thymus was a cavity filled with a clot of coagulated blood. No thrombosis of the blood vessels was found in the lungs. Mendelsohn believes that the bleeding was caused by trauma at birth, although the birth was apparently normal. This case corroborates Schlesinger's opinion, that hemorrhages of gravest import are mainly observed in syphilitics.

(*Der Kinderarzt,* May, 1907, p. 110.) G. R. PISEK.

MARBURG, O.: "ADIPOSITAS UNIVERSALIS" IN TUMORS OF THE BRAIN. (*Mitteilung. der Ges. für inn. Med. und Kinderhk. in Wien.,* October 31, 1907.)

The author reports a case of tumor of the brain in a nine-year-old child, with a marked increase in all the adipose tissue of the body. All the symptoms of the case pointed to the cerebellum as the seat of the neoplasm. He cites numerous authorities tending to show that the theory of pituitary gland involvement in all of these adiposis cases is not tenable.

Attention is called to Müller's case, where the autopsy revealed only a tumor of the cerebellum. Müller had explained his case by the theory that the increased intracranial pressure had caused a dilatation of the third ventricle, and in that way pressure upon the pituitary gland, which pressure produced a functional change in the gland and a consequent adipositas.

An explanation for the occurrence of the great increase of adipose tissue in certain brain tumors, with which Marburg agrees, is offered by Askanazys. He found in a tumor of the pineal gland the structure of a teratoma, and he concluded that the embryonal cells produced some chemical substance, which caused an increase in the fat tissue, similar to the change which occurred in the maternal organism during pregnancy, when the embryonal cells have a like effect.

Marburg concludes that although there is still very little known on the subject, he is inclined to believe that in those tumors of the brain where there is an adipositas universalis it is due not to the location of the tumor, but to the embryonal structure of the neoplasm. E. C. FLEISCHNER.

BABBITT, JAMES A.: PATHOLOGY OF THE FAUCIAL TONSIL. (*Annals of Otology, Rhinology and Laryngology,* December, 1907, p. 802.)

The tonsils are studied under the following heads:—

(1) Anatomic and physiologic characteristics.
(2) Acute and chronic pathologic conditions.
(3) General effect of hypertrophic enlargement.
(4) Physiologic influence upon general metabolism.
(5) Comparative study of hypertrophic changes at stated intervals.

Physiologically, the tonsillar tissues may be said to exercise a resistance to toxic absorption, and the formation of leukocytes has a phagocytic action. Nothing more definite can yet be said of their true function.

The pathologic conditions are divided into acute, chronic inflammations and neoplasms. Special attention is directed to the direct connection between the supratonsillar fossa and the superior crypts and the importance of this part of the tonsil as the seat of most of the infections. The more vertical position of these superior crypts make them good culture tubes for the growth of bacteria. Quinsy probably owes its start to infection from this upper zone of the tonsil.

Under the etiology of chronic tonsillitis, the most frequent cause is repeated attacks of acute tonsillitis; secondly, the infectious diseases; thirdly, the strumous diathesis.

Cases of rheumatism and endocarditis are reported as following acute attacks of tonsillitis, and chronic enlargement predispose to recurrent attacks.

The pathogenic effect of chronic hypertrophy is that of respiratory interference. Close relation to the cerebrospinal and sympathetic nerves accounts for nervous irritation in inflammatory forms. The absorption of toxins through degenerated cryptic epithelium may account for the growing pains of childhood, and dull mental condition. A general summing up by the author is as follows:—

(1) The tonsils become permanently hypertrophied as the result of single or repeated inflammatory changes.

(2) These changes are both hypertrophic and hyperplastic.

(3) The hypertrophy is most common between the ages of four and twelve, disappearing in atrophic changes between thirty and thirty-five.

(4) The lymphoidal action usually retrogrades upon the occlusion of the eliminating surface and ducts.

(5) Systemic absorption may be augmented by the atrophic thinning of the epithelial lining and decreased leukocytosis may accompany abrasion of the surface.

(6) The functional importance of enlarged tonsils during periods of special lymphoidal activity does not exist when such period has ceased.

(7) Statistics do not indicate any special or general systemic deprivation after indicated surgical removal of hypertrophied tonsils. S. W. THURBER.

MEDICINE.

LIEBER, A.: CONGENITAL GOITER. (*Mitteilung. der Ges. für Inn. Med. und Kinderhk. in Wien,* November 28, 1907.)

Heredity seems to be the most important factor in establishing the presence of goiter at birth. Demine collected 53 of these cases, and found that in 23 the mother alone had goiter; in 14, both parents were affected; while in 16 cases neither parent had thyroid involvement. Next to heredity, abnormal birth mechanisms, especially face presentations, are frequently the cause, Bednar and Hecker having found thyroid enlargement in these abnormalities.

The symptoms of the condition are variable. Sometimes, the children are born apparently dead, while in other cases the signs of asphyxia come on several hours after birth. The breathing is difficult, irregular and interrupted, and inspiration is accompanied by stridulous sounds. The patient is hoarse, and at times actual attacks of asphyxia occur. If the goiter is very large, vomiting is present, and sucking and swallowing are rendered very difficult. The presence of these symptoms is probably due to pressure on the vagus. If the dyspnea becomes more marked complications occur, such as atelectasis, bronchopneumonia, congestion of the meninges and brain, and, finally, although very rarely general, convulsions and death.

The prognosis is very favorable, since only in rare cases do the goiters persist more than a few months.

The treatment must be directed toward the attacks of asphyxia. The goiter itself requires no therapeutic measures. These cases should be handled expectantly, and the children put in a position that will facilitate respiration. This is best accomplished by putting a roller bandage under the neck and bending the head slightly backward. Surgical treatment, either tracheotomy or intubation, is contraindicated on account of the very great danger accompanying these operations at this early age.

E. C. FLEISCHNER.

LUCAS, R. CLEMENT: INHERITED SYPHILIS. (*British Medical Journal,* February 1, 1908, p. 250.)

The term inherited is preferred as applied to the form of syphilis which is derived from the parents.

The cause of syphilis, whether inherited or acquired, is the presence in the blood and tissues of the spirocheta pallida.

Inheritance from the father alone is not possible. Inheritance is invariably through the syphilized mother.

When virulent the spirochetes penetrate the chorion or placenta, and occasion miscarriages, macerated fetuses, or premature births; when attenuated by time or treatment the placenta forms a complete protection to the developing fetus and it is the separation of the placenta at birth which allows the infection to take place through the umbilical vein. The immunity of the mother is due to her being inoculated first by the father; a large dose of the spirochetes causing an eruption, and a small dose a syphilis which misses the eruptive stage. The milk of a syphilitic woman, when received into the alimentary tract of an infant, need not convey any infection to the child. The spirochetes cannot be carried in a spermatozoon, but may be conveyed by the fluid parts of the semen.

The question of transmission of hereditary syphilis to the third generation is in doubt because of the difficulty in excluding the possibility of an acquired infection.

The primary stage is the separation of the placenta and the infection of the infant through the umbilical vein. The secondary stage commences from the second week to the third month. It is characterized by eruptions, snuffles, stomatitis, condylomata, wrinkled skin and wasting, enlargement of the spleen and liver, and changes in the bones.

From the second to the sixth year there is commonly a rest in the symptoms which are regarded as characteristic.

During this time the characteristic physiognomy has been gradually formed—the flattened nose, the square forehead, the radiating lines from the mouth, the stunted figure and pallid face; and then during the second dentition the notched incisor teeth, interstitial corneitis and syphilitic deafness are to be looked for. Not one of the viscera appears to be exempt from the disease. Enlarged spleen and liver associated with rickets may be proved almost invariably to be of syphilitic origin.

When both testicles or ovaries are attacked at an early age, producing fibrosis and atrophy, the condition known as infantilism is produced.

A certain proportion of epileptics, deaf mutes and idiots, but not a large percentage, show signs of inherited syphilis. Some cases of hydrocephalus have also been shown to be due to inherited syphilis.

It is important to weigh carefully all the evidence before determining that a particular affection is due to inherited syphilis; and in the future the most certain test of the disease being syphilis will be the presence of the spirocheta pallida in the part affected.

A. W. BINGHAM.

FAIRBANKS, A. W.: CEREBRAL SYPHILIS IN CHILDREN. (*The Journal of the American Medical Association*, March 9, 1907, p. 861.)

Meningitis, arteritis and syphilomata may be, according to the essayist, responsible for symptoms of cerebral syphilis. The diagnosis must be made by studying the symptoms collectively and noting their onset and progress. Syphilitic lesions of the central nervous structure produce phenomena with the following characteristics; they are multiform and apparently without relation; they are subacute as a rule; tend to disappear unexpectedly and reappear in the same, or in some other, locality, finally producing a permanent central lesion. Some of the symptoms yield quickly, while others stubbornly resist specific therapy. Headache and changes in disposition and intellect are often the initial symptoms. Later, inequality and fixation of the pupils, facial palsy, hemiplegic attacks or epileptiform convulsions. The prognosis depends to a great extent on the type of the disease. Gummatous lesions and meningeal processes, if not of long duration, yield to specific treatment. If there is destructive involvement of the hemispheres, the inflammation may be checked, but the destroyed areas remain. The most unfavorable form is that of the arterial lesions. The prognosis is better if the disease begins at a time when changes in disposition and intellect are apt to be more pronounced, and subjective symptoms complained of, so that earlier and more effective treatment may result.

G. R. PISEK.

SURGERY.

SCUDDER, CHARLES L.: STENOSIS OF THE PYLORUS IN INFANCY. (*Boston Medical and Surgical Journal,* September 5, 1907, p. 321.)

From 1888 to the middle of 1907 about 155 cases of this morbid condition have been recorded in the literature. Surgical and pathological observations have demonstrated conclusively that this condition represents a distinct clinical entity. On autopsy, there is found constantly a small, smooth, oval, hard and movable tumor occupying the position of the normal pylorus. The usual size is that of a hickory-nut. This tumor is due to a hyperplasia of the circular muscular fibers of the pylorus. The stomach wall is either hypertrophied or thinned, and the esophagus is occasionally dilated. The hypertrophy of the pylorus produces a narrowing of the pyloric opening. The intestines are often found in a collapsed condition.

Three hypotheses have been offered in explanation of the cause of the hyperplasia. (1) A spasmodic contraction due to gastric irritation occurring after birth. (Pfaundler.) (2) A simple overgrowth of the sphincter. (Nicoll.) (3) Incoordinated action of the muscles of the stomach, dependent on neurosis of the stomach and producing a gastric spasm. (Thompson.)

At birth there are no symptoms referable to the stomach. On the third or fourth day vomiting of all the contents of the stomach begins. This continues at irregular intervals and is independent of the character of the food. There is constant loss of weight. After feeding, discomfort and pain appear. The vomiting is very forcible, often through the nose. The frequency of the vomiting and the amount vomited at one time varies with the frequency of the feeding and the amount given at each feeding. The vomitus does not contain blood, bile or mucus. On careful palpation a distinct tumor is felt above and to the right of the umbilicus. There is often seen gastric peristalsis soon after a feeding. The feces are small in amount and resemble meconium. Gastric dilatation is seen in cases of some duration. There is epigastric fullness and a sunken lower abdomen.

The diagnosis is made by the characteristic vomiting, pyloric tumor, visible gastric peristalsis, gradual and progressive loss in weight. Where the obstruction is incomplete the diagnosis is often difficult.

If untreated it is usually fatal. Where medical treatment has been followed by a cure the existence of the disease was not demonstrated. Surgical treatment has given over 50 per cent. of cures. If the obstruction is complete immediate operation is demanded. If the obstruction is incomplete and the child is losing weight, operation is indicated. If the obstruction is partial and the child is not losing rapidly, a short trial with medical treatment may be justified.

There is immediate danger if the child is not operated in time, and also a more remote danger, in case the child survives, that gastric difficulties will occur in later life. The mortality after the operation is high.

The preferable operation is a posterior gastroenterostomy done by means of the clamp and suture. The Loreta is also recommended.

The author reports briefly 5 cases. A nutrient enema should be given before the operation. The stomach should not be washed out. Ether is the preferable anesthetic. A median incision should be made three inches in length. The opening in the infant's intestine should be from three-quarters to one inch long when sutured. The abdomen should be closed by through and through sutures.

Water should be withheld after the operation. Breast milk is the ideal food. The amount allowed at each feeding must be tentatively determined. At first, it should be for two minutes only, then the time is gradually lengthened. If artificial feeding must be resorted to, whey alone should be given, at first ½ ounce every two hours. Two days later a weak modified milk may be used. Salt solution enemata are useful. The operation is not productive of great shock, but the temperature usually rises to 104°F. and 105°F., soon after the operation. Vomiting persists for several days after the operation. Hernia occurred in two of the author's cases, but no operation was required.

The operation should be done with speed, absolute asepsis, hemostasis, and a minimum amount of handling of the intestines. There should be no trauma to the abdominal wall. The body heat should be carefully conserved. HENRY HEIMAN.

HYGIENE AND THERAPEUTICS.

MUHSAM, RICHARD: THE PYOCYANASE TREATMENT OF DIPHTHERIA. (*Die Therapie der Gegenwart,* February, 1908, p. 79.)

Pyocyanase is a bacteriological ensyme obtained by Emmerich and Loew from the bouillon cultures of bacillus pyocyaneus. It dissolves and destroys not only the bacillus pyocyaneus, but also the anthrax, typhus, the bacillus of diphtheria, the streptococci and staphylococci.

Escherich and Jehle observed that pyocyanase also kills the meningococci and the micrococci catarrhalis.

In the human therapy the preparation was applied by Escherich and Jehle in meningitis. To 39 persons on whom he had found in the secretions the meningococci during an epidemic of meningitis, Jehle injected the pyocyanase into the nasopharyngeal space, and after a few, and sometimes after a single, injection the cocci disappeared.

During a grippe epidemic at the Prague clinic for children, pyocyanase was dropped into the nares of the children. The epidemic was stopped and no further outbreak occurred.

In Pfaundler's clinic Zucker treated the diphtheria patients with pyocyanase, and had very favorable results even in severe cases, and in those which were septic from the start. He had no mortality to record. Finally Emmerich reports his personal experiences, 32 cases with one death. The author made bacteriological studies, which showed a remarkable checking of the growth by the pyocyanase. One drop of pyocyanase to 5 c.c. of bouillon was sufficient to check the growth of the diphtheria bacilli.

Guinea pigs inoculated with 2 c.c. of pyocyanase-bouillon-mixture remained alive, while the control animals died after thirty-six to forty hours.

The increase of diphtheria in Berlin and the apparently severe character of the epidemic (19 per cent. mortality) gave an opportunity to study its effects in a comparatively short time. Twenty-three cases were treated with pyocyanase—5 only with pyocyanase and 18 with pyocyanase and serum. Those cases treated only with pyocyanase were all cured. Of those treated with pyocyanase and serum 4 died; those were exceptionally severe cases, 2 of which were brought into the hospital moribund. In 3 of the deceased tracheotomy was necessary.

The technic of the application is as follows: The patient's tongue is pressed down, then with a spray the liquid is blown vigorously against the tonsils, uvula and the other parts of the mouth; the surplus the patient expectorates. The procedure is repeated twice in ten-minute intervals. The treatment is given three times a day; in the beginning of the disease sometimes still oftener. In nasal diphtheria the preparation is blown into the nose. No injurious actions were observed. The experiences obtained with pyocyanase are such that the author is stimulated to further trials; however, always in conjunction with the serum treatment.

Examination as to the influence of the pyocyanase in surgical infections is being made.

G. R. PISEK.

ROSENSTERN, J.: THE SECRETION OF PEPSIN IN INFANCY. (*Berlin Klin. Woch.*, March 16, 1908, p. 542.)

The quantitative determinations were made by the method of Jacobi, which is both simple and reliable. It is based on the fact that an emulsion of ricin and hydrochloric acid is made clear by the addition of pepsin. As a test-meal the author employed

50 c.c. of tea sweetened with saccharin. He found this preferable to the use of milk, as it was found that when the latter was used a clear solution could not be obtained.

The results of the author's observations are summarized as follows: (1) The pepsin secretion of the healthy artificially-fed infant increases with age up to three months; after that age it has a constant value. (2) Breast-fed infants secrete less pepsin than artificially-fed infants at corresponding ages. (3) Older children who are under weight secrete pepsin in correspondence with their age and not their weight. (4) Digestive disturbances, acute or chronic, do not diminish the quantity of pepsin. In infantile atrophy (the stage of decomposition in Finkelstein's nomenclature) a marked diminution in the secretion of pepsin is observed. HENRY HEIMAN.

TSCHERNOW, W. E.: THE DIAGNOSIS AND TREATMENT OF SPORADIC AND EPIDEMIC CEREBROSPINAL MENINGITIS. (*Jahrb. für Kinderhk.*, February 1, 1908, p. 379.)

The writer observed 15 cases of cerebrospinal meningitis in the hospital, and 9 in private practice. Epidemic cerebrospinal meningitis is always due to the meningococcus. Sporadic meningitis is not always due to the same germ. The most common causes of this form of meningitis are the meningococcus, streptococcus, staphylococcus, influenza bacillus, bacillus coli, bacillus pyogenes and bacillus lactis aerogenes. The changes in the meninges and brain tissue are similar in all; likewise the character of the exudate. The bacteriologic examination of the cerebrospinal fluid is the only means of differentiating the different forms of meningitis. Recovery takes place when the germs begin to lose their virulence and disappear from the tissues; thus indicated by results of lumbar puncture. With improvement in the patient's condition, the germs which are present in the cerebrospinal fluid lose their ability to grow on culture media. When complete recovery has taken place, lumbar puncture yields a sterile fluid.

The treatment with diphtheria antitoxin and antistreptococcus serum is not rational and has been found to be of no practical value. The treatment by means of repeated lumbar punctures is likewise irrational. As in a local abscess the withdrawal of a certain amount of pus by puncture does not cure the condition, so in meningitis the withdrawal of a certain amount of cerebrospinal fluid has no influence in the course of the disease. The treatment with 1 per cent. lysol injection has not yet been sufficiently tried to give a definite opinion as to its real value.

The author recommends the use of the warm bath, daily or twice a day. They have a marked sedative effect, relieve the headache and produce sleep. The effect of the baths is especially marked in the first weeks of the disease.

The hypodermatic injection of morphin is very useful in combating restlessness. In less severe cases, chloral and morphin administered internally have been found more useful than the bromids. HENRY HEIMAN.

DUNN, CHARLES HUNTER: THE SERUM TREATMENT OF EPIDEMIC CEREBROSPINAL MENINGITIS. (*Boston Medical and Surgical Journal,* March 19, 1908, p. 870.)

Flexner's serum is not antitoxic, but bactericidal in nature. The author has used the serum in 15 cases. The diagnosis was confirmed in all but 1 by means of the microscope.

Eight of the cases recovered completely, 2 died and 5 were in the hospital (4 of them convalescent) at the time the paper was written. The 2 fatal cases were of the chronic type of meningitis. All of the cases injected during the first week of the illness recovered. The occurrence of a critical fall in temperature and rapid improvement soon after the injection of the serum speaks strongly for the curative effect of the serum. The results thus far have been so favorable that we are justified in entertaining the hope that it will prove of great value in the treatment of meningitis. In suspected cases of meningitis a lumbar puncture should be performed, and if the fluid obtained is cloudy the serum should be injected at once without waiting for the confirmation of the diagnosis by the microscope.

If the temperature falls to normal and the symptoms improve the injection should not be repeated. If improvement does not occur the serum should be injected daily for three days. In late cases the serum treatment may result beneficially if fever is present and the meningococci can still be found in the cerebrospinal fluid. In chronic cases without fever and with the meningococci absent from the cerebrospinal fluid, the serum treatment is of no avail. HENRY HEIMAN.

ARCHIVES OF PEDIATRICS.

VOL. XXV.] DECEMBER, 1908. [NO. 12.

Original Communications.

INCOMPLETE HETEROTAXY, WITH UNUSUAL HEART MALFORMATIONS.—CASE REPORT.[*][†]

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AND

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Demonstrator of Morbid Anatomy, Jefferson Medical College; formerly Resident Physician, Philadelphia Municipal Hospital.

L. K. White, male, aged six and one-half years. Philadelphian by birth, admitted to our care March 21, 1907.

Family History.—Both parents and two sisters living and well and apparently show no maldevelopment. No history of malignant disease. Maternal grandfather died of pulmonary tuberculosis. Mother had her appendix removed six months before this child was born.

Previous Personal History.—Birth believed by the mother to have been natural vertex, and at full term, a midwife only being in attendance. The child remained blue after birth and the midwife assured the parents that he was a "blue baby." Professional advice was not sought. The baby was breast-fed and escaped illness until three years of age. At this time he suffered from a mild attack of rubeola, from which recovery was prompt. Three years ago he passed through a mild attack of pertussis. No medical report of either illness could be secured and his parents state that his heart had not been examined by a physician until he had reached the age of six years. No note of this examination is obtainable.

Present Illness.—The illness for which he came under treatment began March 21, 1907, with sore throat and headache and was accompanied by slight fever. On the 22d these symptoms were more marked, considerable fever was noted and a scarlatiform eruption was seen on the skin of the trunk and extremities. There was no history of nausea or vomiting.

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[*] From the records of the Municipal Hospital of Philadelphia and the Laboratory of Jefferson Medical College of Philadelphia.

[†] Gross specimen demonstrated at the scientific exhibit of the American Medical Association, June 4, 1907; before the Philadelphia Pathological Society, January 9, 1908, and before the Philadelphia Pediatric Society, when this paper was read, March 16, 1908.

Physical Examination.—A poorly-developed, barrel-chested, pot-bellied, white male child, showing a very poor superficial circulation.

Eyes.—Conjunctivæ are dark purple in color and show in lower outer bulbar quadrants large ecchymoses. Pupillary reflexes are normal.

Nose.—The anterior nares are free from discharge, but show evidence of recent irritation.

Mouth and Pharynx.—The vermillion border of the lips and the entire oral mucosa are dark purplish red in color. Anteriorally the mouth shows no evidence of inflammation. The tongue is dark purplish red in color, the papillæ of the tip are enlarged, but show less discoloration than the adjacent tissue; the dorsum is smooth and clean. The tonsils, pillars, uvula and pharyngeal walls show the same discoloration and inflammation.

Lungs.—Considerable hyperresonance is noted throughout both lungs, except where the heart normally encroaches on the left lung. Numerous fine and coarse dry râles are heard in widely distributed areas of each lung.

Heart.—A slight palpable thrill systolic in time is noted in the parasternal line in the left fifth interspace and also in the mammillary line of the left third interspace. The apex beat is diffuse, but is palpable in the usual location. The maximum intensity of this impulse is noted at the xyphoid cartilage and throughout the upper epigastrium. On percussion, heart dullness is found to be slightly increased in all directions with thoracic dullness, shading into abdominal dullness internal to the mammillary line on the left side. Similar dullness is noted on the right side. On auscultation a loud-blowing systolic murmur is heard over the entire chest. It is transmitted to both axillæ, to the angles of both scapulæ, to both sides of the neck, and is heard over the aortic and pulmonic cartilages and at the xiphoid. The abdomen is tympanitic and greatly distended. Palpation of liver and spleen is impossible. On percussion, there is plainly less dullness in the liver region than is normal, while dullness in the splenic region is much greater than normal.

N. B.—Accurate outlining of these organs is impossible, because of marked pulmonary emphysema and abdominal tympanites.

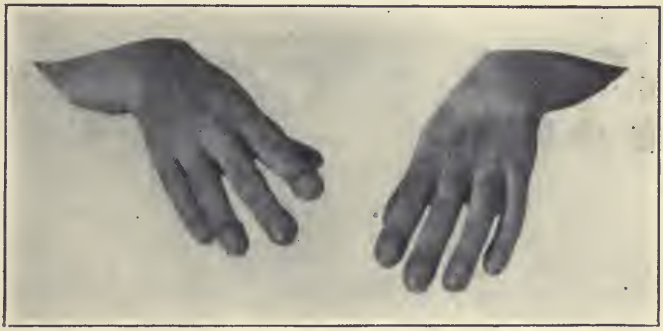

FIG. 1.—Photograph taken after death showing clubbing of fingers.

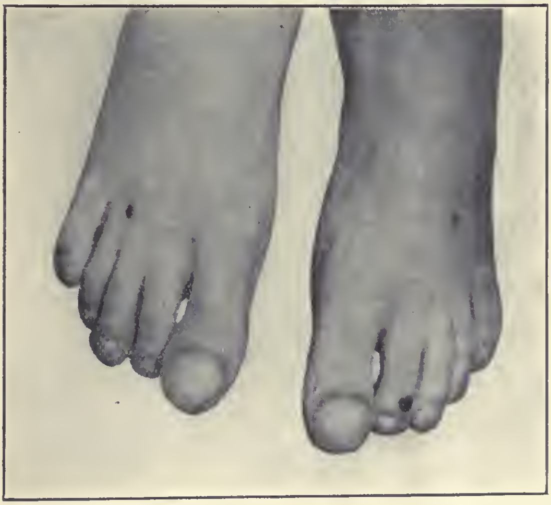

FIG. 2.—Photograph taken after death showing clubbing of toes.

Glands.—All superficial lymph nodes are easily palpable and the inguinal and cervical nodes of the tonsillar areas are tender.

Extremities.—Superficial circulation poor, arms and legs undersized, musculature flabby. Fingers and toes all show typical "drum stick" deformity. The nails are cyanosed, but do not show a capillary pulse.

Skin.—The skin is purplish in color and decidedly mottled. On close inspection with this mottling we find a punctuate purplish-red exantham on chest, abdomen, back, upper arms and upper legs.

A diagnosis of scarlet fever was made at once, and careful study was begun of all viscera.

March 24, 1907.—Skin eruption a brighter red and more widely diffused, throat less irritated, conjunctivæ still injected, heart irregularly intermittent, urine practically normal.

March 27, 1907.—Exanthem fading, pulse rate decreasing, temperature normal.

April 4, 1907.—Skin shows no eruption, desquamation beginning about neck and anterior axillary folds, eyes clear, abdomen shows less tympanites.

April 6, 1907.—General condition good, a few lesions of varicella are seen to-day.

April 8, 1907.—After thorough cleansing of the intestines with castor oil and high enemata, a careful examination was undertaken by us and several medical friends. All agreed as to the heart murmurs and their transmission, as to the palpable thrills and their location, and the location of the heart itself. There was complete unanimity of opinion that a much greater area of dullness was demonstrable in the splenic area than in the liver area and that dullness extended higher on the left side. No one was sure that he could palpate liver or spleen. A provisional diagnosis of transposition of abdominal viscera was urged by several of the physicians present, and that of a very large spleen and a small liver by others.

Note.—Satisfactory palpation and percussion was not possible, because of great distention remaining even after this preliminary cleansing.

Many varicella lesions at this time were purulent and the tem-Temperature 102° F.

April 9, 1907.—Temperature 104°F.; some increase in pulse rate, but no change in heart murmurs. Lungs show no change in rates from previous records. Red cells count 8,540,000 per cubic millimeter.

April 10, 1907.—Several small ulcers are seen on the buccal mucous membrane, and on the soft palate and pharynx, where lesions of varicella have ruptured. Heart somewhat irregular. Temperature 102°F.

April 11, 1907.—A few minutes after midnight the patient complained of some difficulty in obtaining breath, and of pain in the region of the heart. The gaseous distention which had constantly been present seemed to have suddenly disappeared and the belly was flaccid. The liver could easily be outlined by palpation and percussion, and appeared to extend entirely across

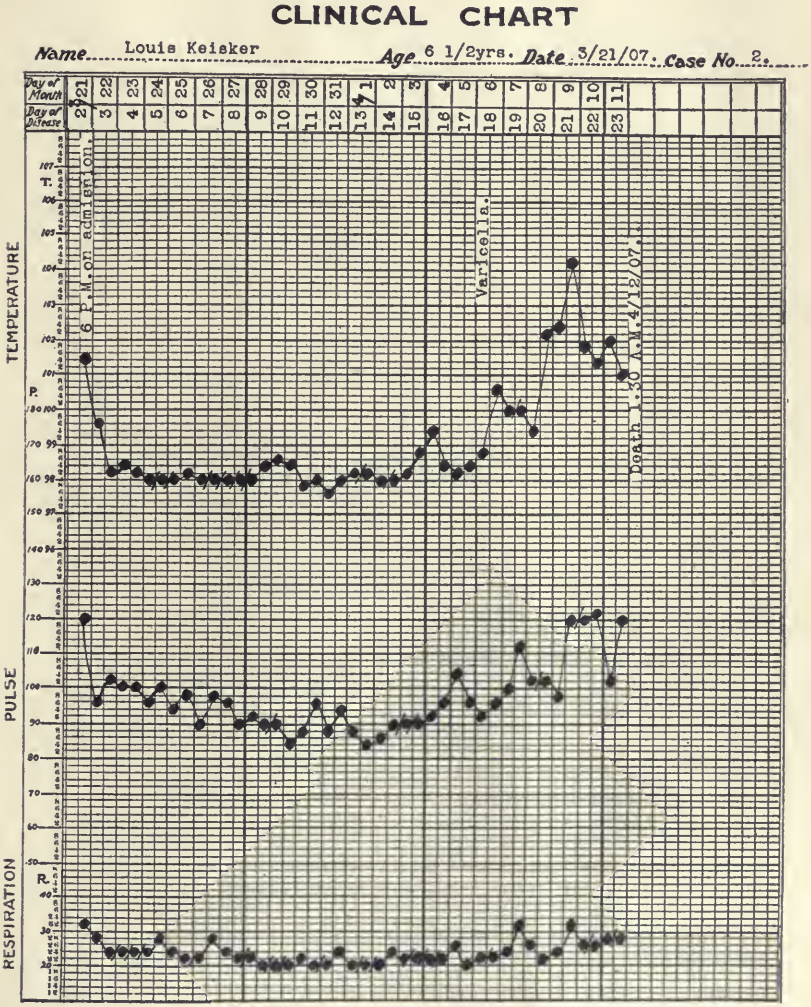

FIG. 3.—Graphic clinical chart during terminal illness, showing temperature, pulse and respiration curves.

the upper abdomen. It was readily palpable 10 cm. below the xiphoid and 5 cm. below the ribs in the mammillary lines. There seemed to be dullness in both flanks. The heart was weak and irregular. Suitable stimulants were ordered, but within half an hour the child complained of severe pain in the precordial region, suffered great dyspnea, grasped his sides as if in agony, secured but shallow respirations, and quickly died.

Death occurred just twenty-four days after onset of scarlet fever and in the declining stage of varicella. No careful examination of the viscera was made the day preceding death except just as life was being terminated. The great enlargement of the liver, in all probability, had taken place during the day preceding death, just as has often been described in the acute infectious diseases.

A diagnosis of pulmonary emphysema and congenital heart disease was made, with pulmonary stenosis, patulous ventricular-septum, patulous auricular septum, and hypertrophied right ventricle; and an alternate diagnosis of patulous ductus arteriosus or aortic stenosis. Transposition of abdominal viscera was also diagnosed by several of the physicians interested in the case and that of a very large spleen and small liver by others.

Discussion.—Pulmonary emphysema was diagnosed because of the hyperresonant barrel-shaped chest, with dry râles widely distributed throughout and prolonged expiration.

Pulmonary stenosis was determined because the heart murmur was systolic in time, was transmitted to the left carotid, because a thrill could be distinctly palpated during systole in the left third interspace just internal to the mammillary line, and because of the associated hypertrophied right ventricle.

Patulous ventricular septum was determined from the transmission of the systolic murmur to the right axilla, from the polycythemia, the red blood count being 8,540,000 per c.mm. and from the associated congenital cyanosis.

Patulous auricular septum was suspected because of the congenital cyanosis associated with polycythemia and clubbing of fingers, and because it is so commonly associated in congenital heart disease.

Hypertrophied right ventricle was diagnosed, because there was demonstrable dullness of 1½ cm. to the right of the sternum in the lower heart area associated with the maximum systolic impulse at the xiphoid with the apex beat in the normal situation.

Patulous ductus anteriosus was suspected, because the systolic murmur was heard as well at the aortic cartilage as at the pulmonic, and because of the transmission to the right carotid. Aortic stenosis was also suspected for the same reason, but was not insisted upon, because no evidence of an hypertrophied left ventricle could be demonstrated.

Transposition of the abdominal viscera was suspected, because a greater area of dullness could be demonstrated in the splenic area than in the liver area, and because the dullness extended higher on the left side. The upper margins of dullness could only be approximated because of the pulmonary emphysema.

An autopsy was performed by one of us (Dr. Wilson), and the clinical findings, except as to details of heart malformations, were confirmed.

We had planned a thorough blood study to be undertaken as soon as the effect of the acute infectious processes had subsided. The sudden and entirely unexpected death prevented this study being made.

Autopsy Findings.—The body is that of a poorly-developed male child of about seven years. Rigor mortis present, but not marked. Lividity is pronounced in the posterior cervical and interscapular regions. The ears are a uniform dark-blue color. The lips are fissured and purplish. Nasal and oral mucous membranes are also discolored. Conjunctivæ show extreme congestion. Pupils are widely dilated and equal.

The lateral halves of the thorax are symmetrically developed; the contour of extremities is the same on both sides. No superficial malformations are present. The right testicle extends to a lower level than the left. The terminal phalanges of fingers and toes present well marked "clubbing."

Preliminary incision shows poorly-developed dark-colored muscles. The round ligament of the liver is absent from its usual position, but on the opposite side there is a fibrous cord-like structure directed upward and to the left.

Abdominal Cavity.—All the organs of this cavity show complete transposition, and there is an associated downward displacement of the large viscera.

The spleens, five in number, vary considerably in size and in outline. They are in close relation to each other, and taken together would make one large organ. They are on the right side and in relation with the lower four ribs, the diaphragm, the right border of the liver, the fundus of the stomach, the right suprarenal and right kidney.

Liver.—The greater portion of this organ is on the left side. It extends 6 cm. below the costal margin in the left midclavicular line, and 3 cm. below the costal margin in the same line on the opposite side. The largest lobe of the liver is the left, although the difference in size between left and right is slight. The quadrate lobe is rudimentary. The Spigelian lobe is represented by a rectangular or oval piece of hepatic tissue that extends transversely from left to right between the inferior cava and the free border of the lesser omentum. The gall-bladder is just to the right of the longitudinal fissure or under the lobe, which corresponds to the left in the normally placed organ. In passing between the layers of the lesser omentum the common bile duct is to the right of the hepatic artery; the portal vein is behind and between these structures.

The stomach lies almost entirely on the right side, the pylorus directed upward and to the left.

The duodenum describes curves which are the reverse of those seen in the normally placed organ. The mesentery begins at the second lumbar vertebra on the right side and extends to the left iliac fossa.

The cecum and appendix are in the left iliac fossa; ascending colon on the left side; transverse colon extends from the under surface of the liver to the spleen, and here becomes the descending colon. The sigmoid is on the right and its curves are the usual ones for a transposed viscus.

The Pancreas.—The head of the organ is in relation with the duodenum to the left of the median line: and the tail extends to the spleen on the right. The duct of Wirsung enters the duodenum with the common bile duct.

Suprarenals.—The left is triangular and placed on the anterior and liver aspect of the upper pole of the left kidney. The right adrenal is a little larger and is semilunar in outline.

Kidneys.—The two organs are approximately of the same size; the left occupies a lower level. The left renal artery is longer than its fellow. The right renal vein is longer than the left and receives the right spermatic vein. The left spermatic vein empties into the inferior cava.

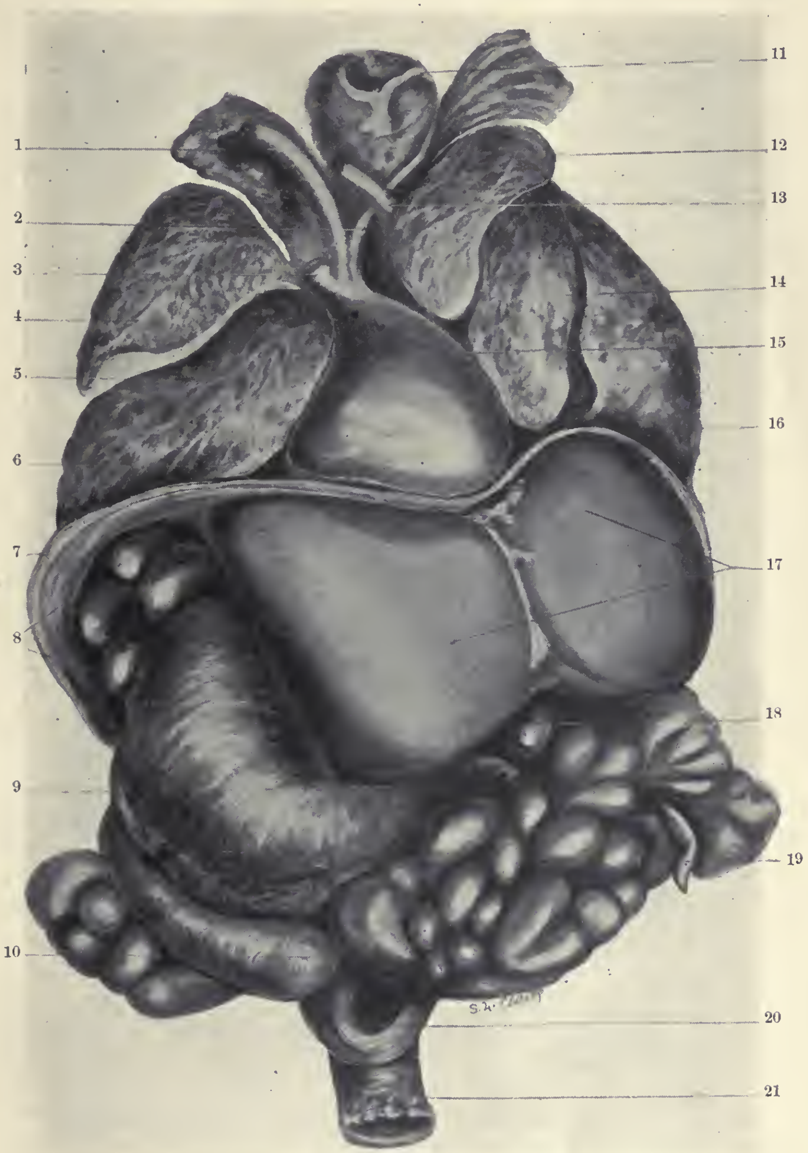

FIG. 4.—Accurate reproduction of specimen by a drawing made one year after autopsy, showing thoracic and abdominal viscera in their relation to each other. The liver is considerably shrunken and does not extend beyond the median line as found when the abdomen was opened. (1) Right common carotid. (2) Left common carotid. (3) Arch of aorta. (4) Upper lobe of right lung. (5) Lower lobe of right lung. (6) Pericardium. (7) Diaphragm. (8) Spleens. (9) Pylorus. (10) Sigmoid. (11) Larynx. (12) Upper lobe of left lung. (13) Right innominate vein. (14) Middle lobe of left lung. (15) Heart. (16) Lower lobe of left lung. (17) Liver. (18) Gall bladder. (19) Appendix. (20) Bladder. (21) Rectum. All rights reserved.

The abdominal aorta lies a little to the right of the median line, and the inferior cava to the left.

The thymus lies in the median line and is about normal in size and shape for a child of six.

The Lungs.—The left lung is the larger and has three lobes; the bi-lobed organ is on the right. The left bronchus is shorter, broader and more horizontal than the right. The relations of bronchus, pulmonary artery and pulmonary vein on the right side are artery, bronchus and vein from above downward. The root of left lung shows the entrance of bronchus, artery and vein from above downward in the order named.

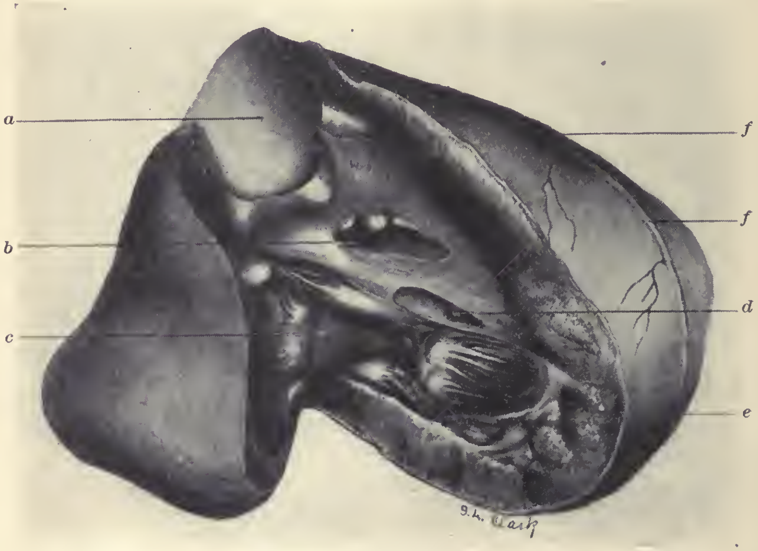

FIG. 5.—Heart opened by incision in right ventricle and prolonged into the aorta. (*a*) Aorta. (*b*) Pulmonary orifice. (*c*) Opening through ventricular septum. (*d*) Right auriculo-ventricular orifice. (*e*) Rudimentary ventricle. (*f*) Interventricular branch of left coronary artery. All rights reserved.

The phrenic nerves are approximately of the same length. The relations of the vagi to the esophagus are completely changed. The right recurrent laryngeal winds around the arch of the aorta.

The azygos major is very large and is seen on the left side. The thoracic duct is between this vein and the aorta and enters the junction of the right internal jugular and subclavian veins.

The esophagus describes curves exactly opposite from the normally placed tube and enters the stomach to the right of the median line.

The Heart.—The heart viewed from in front is triangular in outline, the three sides equal, each measuring 7 cm. The greater portion of the organ is on the left side of the body as it extends 5.5 cm. to the left of the median line. The right border rests on the diaphragm for a distance of 4 cm. before it meets the left border at the apex. Closer inspection shows that this triangular area is only the anterior surface of the right ventricle; and that on the posterior aspect of its left border is a rudimentary left ventricle which does not extend downward to help form the apex.

The auricles are above and on a plane posterior to that of the ventricles. The left auricle is large and receives blood from the inferior and superior cavæ, also from the coronary sinus which opens into the cavity 1.5 cm. to the right of the post cavæ opening. The foramen ovale is widely open, and in addition to this there is further communication between the auricles through a small crescentic opening near the anterior attachment of the septum. From the lower part of this left auricle there is a slit-like opening 1 cm. long which communicates with the rudimentary left ventricle. The right auricle is smaller than the left and receives three left and two right pulmonary veins. The right auriculo-ventricular opening is relatively large and easily admits the thumb.

The left ventricle is very small and has a capacity of probably 12 c.c. The auricular opening is guarded by a valve made by a single leaflet. Two very small papillary muscles are seen, one on the anterior wall, the other on the posterior wall. This single leaflet is on the anterior and internal aspect of the orifice, and when the valve is drawn aside it reveals a narrow opening through the upper part of the ventricular septum. This septal opening is 1.5 cm. long and 1 to 3 mm. wide and goes directly through muscle tissue. The fibrous part of the septum is not demonstrable. The wall of this ventricle averages 3 to 4 mm. in thickness.

The large right ventricle occupies the entire anterior aspect of the heart and as before mentioned is triangular in outline. The cavity has a capacity of probably 70 c.c. From this ventricle both aorta and pulmonary artery arise. The right auriculo-ventricular orifice is guarded by a tricuspid valve. The three cusps could be described as a right or marginal, a left or anterior, and a posterior. Three papillary muscles are seen, an anterior, the fine tendinous cords of which pass to the left and right segments; a posterior, the tendons of which pass to the right and posterior segments; a small septal bundle, the tendons of which pass to the right and posterior cusps. One strong muscle column connects the lower part of the anterior surface with the lower part of the ventricular septum.

The pulmonary artery arises from the upper part of the cavity between the aorta and ventricular septum (or rather the upper part of the septum itself) and on a plane posterior to that of the aorta. The orifice is irregular, averages 3 to 8 mm. in diameter and is entirely surrounded by muscle tissue. No distinct pulmonic valve is demonstrable. This vessel (its pulmonary artery) is directed upwards, backwards, and slightly to the left for a distance of 2.5 cm.; and here under the arch of the aorta bifurcates into a right and left branch. The latter is the shorter vessel. The relations of pulmonary arteries to bronchi and veins have already been mentioned.

The aorta arises from the uppermost part of this cavity in front of, and to the right of the pulmonary artery. The orifice measures 2 cm. in diameter and is guarded by three semilunar valves, two anterior and one posterior. The ascending portion of the arch extends upward and slightly to the right for a distance of 2 cm., and at this point only does the arch of the aorta extend to the right of the median line of the body. The transverse part of the arch is very short, and is directed backwards and to the left. The descending portion of the arch is directed downwards and to the right, but not until the thoracic aorta is reached does this vessel continue its course on the right side.

The left coronary artery arises from the left anterior sinus of Valsalva, runs along the left auriculo-ventricular septum, and divides into a large anterior interventricular and small marginal branch, and then supplies principally the anterior part of the heart.

The right coronary artery arises from the posterior sinus of Valsalva, courses along the right auriculo-ventricular septum and supplies the posterior parts of the organ.

At the junction of the ascending and transverse portions of the arch both common carotids arise as separate trunks. The left crosses obliquely over the trachea and then resumes its usual course. The subclavians arise as separate vessels from the short transverse portion of the arch and its junction.

The ductus arteriosus cannot be found. The bronchial arteries are not enlarged; the left arises from the aorta, and the right from the superior aortic intercostal.

The thoracic viscera, diaphragm, and abdominal viscera were removed *en masse,* and preserved as a gross specimen.

Permission was not obtained to remove brain and cord.

Diagnosis.—Heterotaxy with dextrocardia. Incomplete transposition of the heart cavities and vascular trunks. Pulmonary stenosis. Mitral stenosis. Rudimentary left ventricle. Patent foramen ovale. Incomplete ventricular septum.

Discussion.—Heterotaxy, synonym situs viscerum inversus, situs mutatus, is no longer considered a very rare condition, as more than 300 cases have been reported up to the present time. (Arneill, *American Journal of Medical Sciences,* November, 1902.) Many exhaustive articles have been written on the subject, one of which by Küchenmeister (*Die Angeborene vollständige seitliche verlagerung der Eigeweide des Menschens,* second edition, Leipsig, 1888) is very complete on this subject. Ballantyne's antenatal pathology deals exhaustively with this question, and a splendid summary of the literature by Maude E. Abbott is found in Vol. III. of Osler's Modern Medicine.

This malformation according to these authorities is very commonly complete, all the organs being transposed to the opposite side of the body; but many cases of incomplete transposition have been recorded. In the incomplete variety the abdominal organs are more frequently transposed than are the thoracic organs. Generally speaking transposition of the lungs indicates complete transposition.

Additional malformations and malpositions are frequently encountered in cases of transposition. The most important are those of the cardio-vascular system. Pulmonary stenosis, with partial or complete absence of the inter-auricular septum, and openings in the inter-ventricular septa, are the common lesions. In one case of pulmonary stenosis the inter-ventricular septum was complete, but the foramen ovale remained open, the ductus arteriosus and bronchial arteries were large. Aortic stenosis in this condition is exceedingly rare, only one case has come to autopsy.

The spleen is sometimes polylobulated, and in three instances several spleens were found. Malformed kidney has been found and in one case a single organ existed. Bifid fingers have been described. A peculiar condition has been noted in three cases regarding the position of the gall bladder, namely, its presence under the right lobe of the liver (normally of course it should be under the left lobe). The relations of the portal vein, hepatic artery and common duct are sometimes altered. Persistent thymus has been found at the thirty-fourth year.

True dextrocardia or transposition of the heart is probably always associated with partial or complete transposition of all organs. An exception to this statement seems to have been met with in a case shown by Dr. Gruss to the Vienna Medical Society in 1888, in which true dextrocardia was found with an associated pulmonary stenosis, and not accompanied by transposition of other viscera. (Arneill, *Colorado Medical Journal,* October, 1903.)

Heterotaxy with cardiac malformations has been reviewed by McCrae (*Journal Anatomy and Physiology,* Vol. XL.), and an additional case has been added by him.

(1) Hickman's case showed transposition of lungs, liver, stomach and spleen, the pulmonary artery was represented by a fibrous cord. The foramen ovale was patent and the ventricles communicated. Death at six weeks.

(2) Griffith's case, four and one-half months. Cyanosed in life, had complete transposition of abdominal and thoracic organs, and at autopsy showed a common ventricle with imperfect septum; the pulmonary artery was a fibrous cord closely adherent to the aorta. The lungs were supplied by the ductus arteriosus which gave off two pulmonary branches, and by greatly enlarged bronchial arteries.

(3) McCrae's case. A male infant, forty-nine days old. Before birth a fetal systolic murmur was demonstrated. Transposition was found of all viscera except the gall bladder. The heart showed only one great artery about 1.5 cm. in diameter and only one chamber visible from the front. Four-fifths of the ventricular bulk was made by the ventricle on the right (normal left). The inter-ventricular septum was intact. The small pulmonic ventricle had only one outlet, a narrow tricuspid orifice. The venae cavae entered the left, or ventricle on the pulmonic side, and the pulmonary veins entered the right. The inter-auricular septum is

a small flange of tissue abutting from the posterior surface. From the systemic ventricle came the aorta, the coronaries arising normally. At a point 2 cm. above the origin of aorta the ductus arteriosus arises and divides into two arteries for the lungs. A fibrous cord takes the place of the pulmonary artery.

Geipel (*Archiv. für Kinderheilkunde,* 1902, Vol. XXXV.), in an exhaustive article, reports several cases of complete and incomplete transposition. He describes accurately the positions and relations of heart cavities and great vessels in the various forms of situs inversus, and quotes Fingerhuth's case of transposition of viscera not associated with complete transposition of great vessels. The aorta and pulmonary artery arising from a common cavity.

The same writer has collected several other cases and draws the following conclusions in cases of transposition of great vessels with and without situs inversus.

There may be true transposition with or without transversus; true transposition of the large blood vessels with transposition of the ventricles, with or without situs transversus; corrected transposition of the large blood vessels with transposition of the ventricles with or without transversus; or corrected transposition of a large blood vessel, without transposition of the ventricles, with and without situs transversus.

Heterotaxy without dextrocardia must be extremely rare, as no authentic case can be found except those just described and in McCrae's case he states that on superficial examination, the heart seemed to occupy its usual position, but careful study showed that the organ was more or less transposed.

In our case also the ventricle on the right corresponds anatomically in many respects to the normal right ventricle, but the auricles are completely transposed. The orifice of the pulmonary artery is entirely surrounded by the muscle of the ventricular septum. Mitral stenosis is present. Pulmonary stenosis, which is common in transversus, has not previously been decribed in association with mitral stenosis.

Our case then is one of those very rare instances in which we have transposition of all viscera except the heart itself, and in which the auricles are transposed in a normally placed heart.

The heart murmur heard during life was made at the stenosed pulmonary orifice. The two great vessels emerging from the same ventricle transmitted this murmur in the course of the blood streams equally well to both carotids. With this for circulatory purposes, single ventricle almost centrally placed, and having an equal amount of heart tissue to left and right, the sound was equally well transmitted to both axillæ and to both sides of the back. The other heart malformations and the lung transposition could not have been diagnosed except by necropsy. The abdominal transposition was anticipated.

It gives us pleasure to credit Dr. Newman with recording the clinical data; Dr. Holmes with making the red cell count, and Drs. Holmes, Beardsley and Percival with careful examinations with us and a large share in determining the final diagnosis; and Dr. W. M. L. Coplin, at the time Director of Public Health and Charities in the city of Philadelphia, with careful study of the specimen with us after it had been deposited in the museum of Jefferson Medical College.

SOME GASTRIC CONDITIONS IN WASTED INFANTS.—R. Miller and W. H. Wilcox (*Lancet*) make a plea for examining gastric contents in wasting infants. They refer particularly to results in atrophic dyspepsia and hypertrophic pyloric stenosis and acid dyspepsia. The first group shows a diminished activity of both acid and ferment secreting glands. There is no retention of food in the stomach and there is no mucin. In the second class there is, as a rule, a marked increase in the ferment activity, together with excessive secretion of mucin. There is also found to be very obvious retention of food in the stomach. The total acidity is variable, but tends to be below normal, varying doubtless indirectly with the amount of gastritis present. It may be pointed out that after regular gastric lavage has been carried out for a short period the gastric contents begin to lose their abnormalities—the mucin becoming less in amount, the ferment activity diminishing, and the acidity at the same time more closely approaching the normal. In the third variety the gastric contents show an increase in their total acidity, the ferment activity being normal or below normal. There is no mucin, but there is obvious retention of food in the stomach. The clinical symptoms of the various conditions are fully described, together with treatment.—*Medical Record.*

THE CAUSATIVE FACTORS OF THE PARALYSES OF EARLY LIFE.*

BY ROYAL STORRS HAYNES, M.D.,
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The paralyses of early life have, as their primary causal factors lesions of the motor tract. These lesions may occur at any point from the cortex to the muscles. They may be due

(1) To congenital defects or malformations.
(2) To lack of development of cortical cells.
(3) To injury to the tract
    from trauma,
    from pressure of hemorrhage or fluid or inflammatory exudate,
    from the displacement of bone, or
    from the growth of neoplasms.
(4) To inflammation of the nervous tissue in brain or spinal cord or peripheral nerves.
(5) To poisoning by bacterial toxins or chemical poisons.
(6) To degenerations of the nerve cells or muscle cells.

These various lesions may reproduce in the young organism the clinical pictures of nearly all the nervous affections of adults in which paralysis is a symptom. However, some of these lesions occur with frequency in the etiology of paralysis in early life and others are of a rarity so great that no instance of them will occur in the experience of a given observer. Therefore, though the consideration of all of these affections would be of great interest from a purely scientific standpoint, from the orthopedic point of view and especially from that of a ten-minute paper, it seems more fitting to consider those which occur most frequently and which result in the greatest number of cases of paralysis.

Therefore, beginning with the periphery, we will consider

(1) Primary Muscular Dystrophy,
(2) Obstetrical Paralysis,
(3) Diphtheritic Paralysis,

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* Read before the New York Academy of Medicine, Sections on Pediatrics and Orthopedic Surgery, October 16, 1908.

(4) Pott's Paralysis,
(5) Infantile Spinal Paralysis,
(6) Infantile Cerebral Paralysis,

and dismiss with mere mention the other forms of peripheral paralysis, multiple neuritis due to alcohol or lead, myelitis, syringomyelitis, tumors of spinal cord and brain, brain abscess, hydrocephalus and spina bifida.

PRIMARY MUSCULAR DYSTROPHY.

Primary muscular dystrophy is an instance of primary degeneration of the motor tract, the degeneration affecting the muscles only. Here the paralysis is due to atrophy of the muscle fibers and the consequent loss of power in the muscle as a whole. Previous to, or coincident with this atrophy, there is a deposition of fat in the muscle fibers and an increase of the interstitial tissue of the muscles. The deposition of fat causes the pseudohypertrophy which gives its name to one of the types of this disease. There is no change in the nerves and the late lack of response to faradism is due to loss of contractile muscular tissue and is not a reaction of degeneration. Clinically, paralysis from this affection occurs before the tenth year, occurs most often in boys, has an hereditary tendency and runs in families. The distribution of the paralysis may be of three types: (*a*) Of the face and shoulder girdle (Landouzy-Déjerine); (*b*) of the muscles of the back and arms (Erb's Juvenile type); (*c*) of the muscles of the back and lower extremities (muscular pseudohypertrophy).

OBSTETRICAL PARALYSIS.

Obstetrical paralysis is a paralysis of peripheral nerves resulting from an injury to these nerves during labor. The characteristic type (upper arm type, or Erb's palsy) is due to injury to the brachial plexus. The seat of injury is commonly the junction of the fifth and sixth cervical nerves. The resulting paralysis affects usually the deltoid, biceps, brachialis anticus and supinator longus—often the supra- and infraspinatus muscles. The brachial plexus being exposed in the posterior triangle of the neck, pressure from one blade of the forceps, traction on the head to deliver impacted shoulders, traction on an arm, or, as is most often the case, pressure by the fingers in the supraclavicular fossæ in the delivery of the after coming head, may inflict a severe laceration to the nerves in this situation on one or both sides.

Facial paralysis and paralysis of the lower extremities may, with great rarity, result from similar trauma to peripheral nerves during labor.

DIPHTHERITIC PARALYSIS.

Diphtheritic paralysis is the result of a multiple neuritis due to the absorption of the toxins of the diphtheria bacillus. It occurs in from 5 to 15 per cent. of all cases of diphtheria, but it is rare up to two years of age. It complicates both the mild and the severe types of the disease, but it is more likely to occur with the severe cases, and especially in those cases where antitoxin has not been administered or has been administered late.

The palate is the part first and oftenest affected. The muscles of accommodation follow and then those of the upper and lower extremities. The nerves of the extremities are probably always affected, as is indicated by the very constant absence of the knee-jerk; but actual paralysis of the extremities occurs, according to the statistics of the American Pediatric Society, only in about 11 per cent. of the cases of paralysis. Paralysis of the pharynx, heart muscle and muscles of respiration may occur. The lesion in diphtheritic paralysis consists of a degeneration in the particular peripheral nerve supplying the paralyzed part and, in long standing cases, a marked degree of change in the muscles themselves.

POTT'S PARALYSIS.

In from 5 to 6 per cent. of all cases of Pott's disease paralysis may occur. The usual site is the upper and middle dorsal region, where the canal is smallest and the fixation least efficient. The paralysis results from the compression of the cord with interference to the blood and lymphatic circulation, increase in the connective tissue and degeneration of the nervous elements. The compression may be due occasionally to displacement of bone, but usually to the breaking through into the canal of the tuberculous process in the bodies of the vertebræ with pressure on the cord by inflammatory products and thickening of the cord coverings. Actual destruction of the cord by tuberculous disease is rare, and even much compression may be recovered from. Pressure on the spinal nerves before, or just after their exit may be the cause of this form of paralysis irrespective of injury to the cord proper.

INFANTILE SPINAL PARALYSIS.

Infantile spinal paralysis, or poliomyelitis, is by far the most important of the causes of paralysis in early life. At the Hospital for the Ruptured and Crippled, in a series of 2,028 cases of nervous trouble, 75 per cent. were poliomyelitis, 20 per cent. were due to cerebral disease, and the remaining 5 per cent. covered all other types of cases. In another series of 611 cases, 463 were poliomyelitis, 121 paralysis of cerebral origin, 16 were cases of obstetrical paralysis, 4 were cases of pseudohypertrophy, and 7 were miscellaneous cases.

Poliomyelitis occurs sporadically and epidemically. It occurs oftenest in summer, the months from June to September showing over 70 per cent. of the cases. In some epidemics, dry weather and low water seemed factors. Children in the first three years of life present 77 per cent. of the cases. Both sexes are affected equally and the strong as well as the weak.

The disease seems to be an infection dependent upon the action of a specific micro-organism, which, however, has not yet been satisfactorily determined, though a diplococcus was isolated in several of the cases of the Norway epidemic of 1903-1905 cultures of which, injected into mice, rabbits and dogs, uniformly produced paralysis of the hind legs. Many observers, however, have failed to find any organisms in spinal fluid or cord. Others have reported lesions of the cord similar to those of poliomyelitis in lead and arsenic poisoning.

The communicability of the disease is evident from the occurrence of epidemics and by the number of authenticated instances of several cases in the same family, and of the development of the disease soon after exposure. The digestive tract may be the portal of entry. Pointing to this are the occurrence of the disease in summer and the frequence of gastrointestinal disturbance at the outset. Milk may be the carrying agent, and a toxin liberated in the intestines by some anaerobic bacterium, carried to the spinal cells by the blood current, may be the actual cause of the changes in the cord.

Examination of the cerebrospinal fluid shows it to be almost uniformly clear and colorless, usually without cellular elements, or with only a few mononuclear leukocytes. On culture, unless contaminated, it usually has been found sterile by most competent observers.

The anatomical lesions are confined to the central nervous system, occurring most markedly in the enlargement of the spinal cord. In cases dying early in the disease, microscopical examination shows a diffuse inflammatory process closely related to the blood vessels. This process is found chiefly in the gray matter of the anterior horns; it is noticeable, however, in the white matter and in the pia. This inflammation extends throughout the whole length of the cord, but is most pronounced in the cervical and lumbar enlargements. There is an infiltration of small and large mononuclear leukocytes in the white matter and in the pia, and of polymorphonuclear leukocytes in the gray matter. There is a marked degeneration of the ganglion cells over large areas of the cord, and the inflammation is of wider extent than the clinical symptoms would indicate. Hemorrhages are seen, and even hemorrhagic cavities, in the anterior horns. The lesions in the pia are found to correspond to the degenerations in the anterior horns, but to be of greater extent than the inflammation in the gray matter. It seems evident from this that the infection occurs first in the spinal fluid and the pia, and extends along the blood vessels to the ganglion cells. In fact, the pia over the medulla pons, cerebellum and cerebrum is often found to be the site of inflammation when there is microscopically no evidence of inflammation in the gray matter there and when clinically the cases show merely paralysis of the extremities. In the severest cases with a picture of poliomyelitis and encephalitis, degeneration is found in the gray matter everywhere. The wide extent of the inflammation in all cases, however slight the clinical manifestations may be, and the occurrence of cases with bulbar and cerebral symptoms with a pathology similar to the mild cases, bring into our present idea of infantile spinal paralysis the clinical types of Landry's paralysis and encephalitis.

The lesions found in cases dying some time after the onset of the disease are sclerosis of the affected areas in the cord, degeneration of their peripheral nerves and atrophy of the muscles.

INFANTILE CEREBRAL PARALYSIS.

Infantile cerebral paralysis is second only to infantile spinal paralysis in the frequency of its occurrence, as the figures from the Hospital for the Ruptured and Crippled, already quoted, show.

Paralyses of this type may be congenital or acquired, the former being the more frequent. The congenital cases usually show paralysis during the first year. They may be due to causes within the uterus or to injury during labor. In the former cases there may be a history of neurotic taint in the family of the nature of hereditary epilepsy or insanity; there may be an accident or an injury during the later months of gestation, or wasting illness on the part of the mother. Syphilis is a doubtful cause. The anatomical lesions here are of the nature of large defects—half or more of one hemisphere, or of both, may be wanting or some parts may be poorly developed. The condition of agenesis corticalis, in which there is a defective development in the pyramidal cells in all parts of the brain, may be present. Defects in the development of the pyramidal tract may be a cause.

The congenital cases occurring at birth are due to meningeal hemorrhage and secondary changes—chronic meningoencephalitis, sclerosis or the formation of cysts. The most frequent cause of such a hemorrhage is tedious labor. Less often the hemorrhage is due to the pressure of forceps during delivery, while it may be a part of the hemorrhagic disease of the newly born, of syphilis, or of an infection. To the great extent of the lesions in the antenatal cases, and because in the birth palsies both hemispheres are exposed to the effect of the trauma, is due to the fact that congenital cases have characteristically diplegias and paraplegias as contrasted with the hemiplegias of the acquired form.

The cases of acquired cerebral paralysis are usually seen before the fifth year and, as stated, are characteristically hemiplegias. The paralysis may follow traumatism; it may occur in the course of infectious diseases such as scarlatina, measles, diphtheria, small-pox, pneumonia or whooping-cough. In whooping-cough the mechanical force of the paroxysms probably has considerable effect. A cerebrospinal meningitis from which the child recovers may set up a chronic meningitis which will result in paralysis. Convulsions are regarded both as the cause of paralysis and as an evidence of its beginning. They are probably causative factors.

The primary lesions found in these cases are hemorrhage, usually meningeal, embolism, thrombosis, chronic meningitis and encephalitis.

The secondary lesions are the usual sclerosis and atrophy, with degeneration of the pyramidal tract.

In conclusion, I would merely repeat that paralyses in early life may be due to lesions in any part of the motor tract; that they may be caused by any one of several factors; that a number of clinical affections which cause paralysis exist, but that poliomyelitis and cerebral lesions cause an overwhelming majority of the cases.

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MALNUTRITION.—Friedlander (*Lancet-Clinic,* January 18, 1908) gives the etiological factors of malnutrition as heredity, improper feeding, bad hygienic surroundings, more especially the lack of fresh air due to the fear of "catching cold," and school strain. School children should be kept in the fresh air as long as possible after school hours, open air being much more advantageous than gymnastic exercises. In addition to the ordinary symptoms, the tendency to catarrhal inflammation of the various membranes and the great liability to recurrence of attacks, together with anemia and a frequently fretful, irritable, high-strung and precocious temperament, are generally prominent. The treatment, hygienic and dietetic, suggests itself. Medicinal treatment plays a subordinate rôle. Constipation should be corrected. "Hardening," when it hardens, is good and should be urged, the test as to its value lying in the vigor of reaction. When depression in place of vigorous stimulation results, the process is, of course, harmful. In regard to medicine, Friedlander has found the iodids, usually given in one of the organic compounds, to be excellent alteratives, especially in recurrent bronchial attacks.—*Journal of the American Medical Association.*

THE DIAGNOSIS OF PARALYSES OF EARLY LIFE.*

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The chief factors in the diagnosis of the paralyses of early life are the proper elicitation of all obtainable facts concerning the onset, the clinical features of the paralysis, and, in some instances most important, the progress the disease has already made. Not infrequently a diagnosis will depend absolutely upon one of these, and our conception of the disease will be influenced by a single feature, which at first may appear so insignificant that it escapes notice. I need only contrast the onset of an acute anterior poliomyelitis or infantile hemiplegia with that of a dystrophy; the distribution of the paralysis in birth palsy with spastic diplegia, or the progress of Landry's paralysis, cerebral hemiplegia and multiple sclerosis, to illustrate what is meant.

The first important step in our differentiation of the various forms of paralysis, is the determination of the seat of the causative factor; whether it be in the nervous system at all; if so, whether it is peripheral or central, and, if the latter, whether it is cerebral or spinal.

To do this it is necessary to subject the patient to a thorough systematic examination in order that we may know if we are dealing with an actual affection of the nervous system or simply a local condition causing a limited motion of the affected part. Adhesions about a joint, subluxations, local inflammatory conditions, anything producing pain when the particular muscular activity of the part is brought in play, tendon lesions, and contractures resulting from connective tissue transformations, all produce limited motion that may easily be mistaken for paralyses of nervous origin if we do not bear them in mind.

The separation of peripheral from central lesions, usually simple, is often extremely difficult and demands a most careful consideration of all the etiological factors, the type of the paralysis, the reactions, the condition of the reflexes and of sensation. Even then we are sometimes obliged to wait and watch the progress of the disease in order to satisfy ourselves as to its true nature.

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* Read at the New York Academy of Medicine, Sections on Pediatrics and Orthopedic Surgery, October 16, 1908.

There are a few general considerations, however, which serve as guides and may be of help in separating these two classes. The phenomenon known as spasticity, which is in reality a symptom complex comprising muscular rigidity, exaggerated reflexes clonus and the Babinsky phenomenon, is almost invariably dependent upon a degeneration in, or lack of development of, the pyramidal tracts. I say almost invariably for the reason that even this most constant axiom of neurological observers has its exceptions. We find in that group of cases known as Little's disease, or infantile cerebral spastic paralysis, concerning whose proper classification there has lately been so much discussion, several instances, both of intra-uterine and post-natal origin, in which such competent observers as Freud and Gangenhofer could find no degeneration in these tracts, although clinically the cases were typical. The muscular rigidity may betray itself in many ways. The gait, for instance, is slow, stiff and awkward, the excursions of the joints limited, and there is a tendency to drag one or both feet, as the case may be. There is a marked absence of the active, snappy, restless, sometimes skipping, characteristics that remind one so frequently of steel springs in the gait of a normal child. The amount of resistance to passive movements of the limbs is often hard to determine, by reason of the difficulty in persuading young children to relax, and it becomes necessary to carefully compare the two sides and employ various means to distract the attention in many cases before we can properly determine the presence or absence of this phenomenon. An exaggerated reflex is to be found in the actual power and suddenness of the response rather than the degree of the joint excursion, since we may have the joint excursion limited by contractures or rigid antagonists with pathologically exaggerated reflexes, whereas, on the other hand, the jerk may be very lively with a wide excursion of the joint and still not exaggerated. Clonus is frequently lacking, although when present and permanent it is always pathological. Most authors, notably Sachs, Fraenkel and Putnam consider the dorsal extension of the great toe on stimulating the plantor surface of the foot, a normal phenomenon in children under two to four years. Although this may be the rule, I have frequently seen a decided difference in the responses of the normal and pathological sides in some cases of infantile hemiplegia of that age. Other manifestations of central involvement are ataxia, either of station or gait, the incoördination, athetoid movements, intention tremor, and titubation seen in cerebellar disease, and the various forms of spasms, tonic or clonic. Peripheral palsies, on the other hand, we expect to follow more closely the distribution of the affected nerves, and, with a few exceptions, to be associated with great pain and tenderness of the affected parts.

Nearly all of the symptoms of paralysis may be met with in peripheral as well as central lesions, and it is rather by a careful consideration of the sum total of the symptoms, with all possible attention to the order in which they have developed, that we are enabled to reach the conclusions which our judgment tells us is correct. Thus we have all doubtless seen paralyzed muscles with extreme rigidity, and even contractures in both multiple neuritis and spastic paraplegia. We have seen paralyses and great tenderness in anterior poliomyelitis and multiple neuritis, flaccid paralysis with anesthesia in neuritis and myelitis, and yet only in rare instances do we hesitate to differentiate between these conditions. In peripheral palsies we see hard, rigid muscles in dealing with an acute inflammatory process, but it is revealed by the intense pain and tenderness, a condition we neither find nor expect in spastic states of central origin.

The reflexes alone and of themselves help us very little. A mild toxic neuritis may produce enough irritation of the muscle plates to give us an exaggerated reflex, and so be of little aid in distinguishing pyramidal tract lesions, while, on the other hand, the disease process may be so profound that the transmission of nerve impulses on either side of the reflex are blocked and we find them diminished or lost. The same is true of electrical reactions, for it can readily be seen that anything which destroys the communication between the muscle and its trophic center in the cord can produce the same effect as that following destruction of the center.

The disturbances of sensation, when present, are of great help in distinguishing central from peripheral lesion. There are, of course, some exceptions, but, as a rule, we may say that we have a right, in peripheral conditions, to expect anesthesia or hyperesthesia to manifest itself in the cutaneous distribution of the affected nerve or nerves; whereas, in central types they appear in the areas corresponding to the segments of the cord. Again, we usually find, except in injuries to the nerve trunks, *i.e.,* blows, rupture or separation, that the anesthesia is less sharply defined and presents a more confused picture in peripheral lesions than in central.

Hyperesthesia is widely distributed in peripheral lesions, while in central disturbances we find it clearly confined to a zone denoting the upper segmental limits of the disease process. This, of course, does not apply to the diffuse active inflammatory states in the cord and its coverings, such as anterior poliomyelitis or meningitis. In these states the intense hyperesthesia is due to irritation of the posterior roots, and naturally has no sharply-defined boundaries.

The differentiation of cerebral from spinal forms of paralysis is usually not difficult, and depends almost entirely upon the application of our knowledge of the anatomy and physiology of the central nervous system. Of course there are always instances where this does not suffice, and we are obliged to bring to our aid the additional support of existing external conditions, the presence of epidemics, etc. As a rule, however, this is true. I need only call attention to the clinical pictures presented by infantile cerebral hemiplegia and acute anterior poliomyelitis, especially in regard to the distribution of the paralysis, to illustrate what is meant.

I have purposely left till now a factor in the diagnosis of early paralyses, which is, perhaps, the most important of all. I refer to the careful inquiry into the mode of onset. Not infrequently the diagnosis depends on the manner in which the palsy first appeared; whether at birth or shortly after, whether its début was abrupt or gradual, or whether it followed febrile states however mild, convulsions or coma. Often only the most searching enquiry will satisfy us in this regard, and we can never afford to overlook this period of the disease in any case.

It is not my intention to give a categorical differentiation of the various paralyses. That would not only be tedious, but may be read elsewhere with greater profit. I desire, rather, to call attention to some of the difficulties attending a diagnosis of these states as they are seen in one of the neurological clinics of this city.

Perhaps one of the most puzzling distinctions we have been obliged to make, recently at all events, has been between mild cerebrospinal meningitis, acute anterior poliomyelitis, and multiple neuritis. Each one of these states has its own distinctive features in well-pronounced cases, and we do not hesitate long when we meet them. Meningitis with the coma, delirium, restlessness, convulsions, rigidity of the neck, spine and hamstring muscles, disturbances of the cranial nerves, and the presence of meningococci in the cerebrospinal fluid, even though it may be quite clear; acute anterior poliomyelitis, with the mild or severe febrile onset, gastro-intestinal disturbances, followed by sudden paralysis flaccid in type, with lost reflexes of the paralyzed parts, atrophy and altered electrical reactions; multiple neuritis with moderate fever, intense paresthesias, hyperesthesias, pain, tenderness and edema and paralysis of those muscles supplied by the affected nerves, are all clinical pictures not easily forgotten.

Occasionally, however, we see certain types, mild in onset and progression, where the chief symptoms are prostration, moderate fever, inability to move the limbs, pain, tenderness, and abolished reflexes. We can see at once that we are dealing with some form of intoxication affecting the peripheral or central nervous system, but it is not clear that either one or the other is involved, and it often becomes necessary to wait and follow carefully the progression of the case or the development of further symptoms before it is possible to gain an understanding of the true nature of the process. Thus if the symptoms of general intoxication subside, leaving a flaccid paralysis and atrophy of one or more muscle groups, R D, and absent reflexes, we know we have been treating a poliomyelitis. If the symptoms become steadily worse and more profound, or remain stationary, the improvement being very gradual while the most lasting symptom proves to be rigidity of neck and back with Kernig's sign, we have most likely been dealing with a mild cerebrospinal meningitis. There are, however, certain extremely mild forms where the diagnostic features that are usually so pronounced in these two diseases are, on the contrary, so vague and uncertain that by reason of the presence of an epidemic of one or the other we are justified in making a mere surmise only of the real condition. Unquestionably those cases of mild fever, more or less pronounced rigidity of the neck or back, with Kernig's sign at the onset, but which progressed favorably leaving a slight residual paralysis, must now be classified as poliomyelitis, although they were formerly considered mild cerebrospinal forms.

I should like here to warn against a too hasty diagnosis of sporadic forms of cerebrospinal meningitis, because I firmly believe that this diagnosis should only be made after a thorough exclusion of all possible sources of a local infection which might, because of absorption of toxins by the meninges, produce this condition. My belief in this has been quite recently strengthened by a case which occured in one of the large hospitals of this city. A child of eight years was sent in with a slightly discharging ear, profound coma, restlessness, and every indication of meningitis. The mastoid was opened and cleaned, and the dura explored for localized meningitis, which was not found. The symptoms persisted and the child became steadily worse. Repeated examinations of the cerebrospinal fluid, both at the laboratory of the hospital and at the Rockefeller Institute, failed to reveal the presence of meningococci, although in the absence of purulent exudate in the cerebrospinal fluid and any positive indications of brain abscess, the inclination of opinion of those who saw the case was toward that diagnosis. At the autopsy the nasal accessory sinuses, more particularly the sphenoid, were found filled with pus, the absorption of whose toxins had caused a limited basilar leptomeningitis and ependymitis of the fourth ventricle.

In peripheral neuritis, let us say of toxic origin, there is a more intimate relationship between the pain and paralysed muscles, and it has usually been our experience that there is a greater disproportion between the paralysis and the altered reflexes. For instance, in a case of multiple neuritis of more than two years' duration, long after motion was fully restored in the limbs and the painful phenomena had disappeared, the reflexes remained abolished and only now are returning. Again, as Sachs rightly remarks, the knee-jerks may be absent for a long time in diphtheritic pharyngeal paralysis.

The diagnosis of infantile cerebral palsies is usually to be determined by the spastic character of the paralysis, the diminished intelligence and history of onset. I think it safe to say that in the acquired types of diplegia, hemiplegia or monoplegia the onset is almost always stormy, with coma or severe convulsions. They need only be confused with birth palsy when the spasticity is so slight that it may be overlooked, or at a very early age before the child has learned to overcome the embarrassment of the paralysed arm. The progress of the case is also different, since motion, however stiff and awkward, usually appears sooner and is more evenly distributed throughout the whole limb in cerebral types than in brachial.

In later years the affected intelligence alone will often betray a cerebral palsy, for out of 50 cases seen within the last three years only 1 was of average intelligence. The marked improvement seen in the prenatal types of diplegia is considered by some to be of great diagnostic value in those cases which because of cranial complications, intention tremor and nystagmus may be confused with multiple sclerosis. Another important feature in the differentiation of these two is that, in the latter, the marked undulating character of the diminution and recurrence of symptoms is one of its most distinguishing landmarks.

The diagnosis of the different forms of atrophy is often extremely difficult, and our first aim should be to separate the spinal atrophies from those commonly known as dystrophies. There are a few general considerations which should help us materially in this regard. In the latter, we find the proximal end of the limb most affected, the most characteristic sign is weakness of those muscles which fix the vertebral column to the pelvis, and the reflexes and electrical reactions disturbed in proportion to the amount of muscular wasting. Some forms may be recognized by the hypertrophy, or pseudohypertrophy, of certain muscles, such as the deltoids or gastrocnemius group. A history of repeated occurrence in a family is also very significant. The spinal forms, on the other hand, usually begin in the distal end of the limb, the atrophy selects the smaller muscles first, is intimately connected with the weakness of the part, and gradually extends upward often symmetrically invading the opposite limb before it has become extensive. The reflexes are lost early and the electrical reactions show definite changes almost from the beginning. We are sometimes called upon to make a distinction between either of the foregoing and a severe polyneuritis, but whenever a complete history can be obtained there should be little or no difficulty. The onset is so different in the latter. It is more abrupt, the limbs are affected symmetrically and the paralysis more widely distributed from the beginning, the extensors are usually more affected than the flexors and, besides, there is always the history of exposure to the etiological factor, be it lead, arsenic, diphtheria toxin, or any other.

The diagnosis of facial palsies of peripheral origin from those of central causation should never disturb us. We have only to keep one feature in mind, namely, that in the former all three branches are more or less evenly affected, while in the latter only those muscles supplied by the two lower branches of the facial nerve show disturbed function.

In closing, let me call your attention to a class of cases seen occasionally in our clinic at the Post-Graduate Hospital that has always seemed rather difficult of interpretation. The children, usually under three years, are brought because of muscular weakness, either inability to walk or stand or sometimes even to sit up. If you examine them you will find them undersized, somewhat backward as to their mentality, although this is not always true, their musculature fully developed, but flaccid and nearly powerless, reflexes variable, no electrical changes, and nothing to give us any reason to suspect any form of hydrocephalus whatever. Aside from the muscular weakness and flaccidity the most distinctive feature of these cases lies in pronounced signs of rachitis, more especially the beaded ribs and altered joints. That this condition is dependent upon rachitis I have very little doubt, since if the treatment is directed to this condition there is always immediate improvement, which usually leads to good use of the weak muscles and a normal development. Although I may have attempted the description of a state that may be common enough in pediatric clinics, it has nevertheless been extremely rare in ours, and as I have never been able to find a description I take this opportunity of mentioning the condition in the hope of arousing some discussion.

37 W. 54th Street.

ELECTROTHERAPY IN PARALYSES OF EARLY LIFE.*

BY THEODORE A. ROMEISER, M.D.,
New York.

In the treatment of paralyses the utility of electrotherapeutic measure is still a question open to discussion. There is also some diversity of opinion regarding the form of electricity preferable in special cases, especially relative to the three modalities most used—static, faradic, galvanic and their various modifications. Nor is there by any means unanimity of opinion amongst the authorities concerning the strength of current most beneficial for a given condition.

Much depends on the nature of the paralysis—spastic or flaccid—and its degree and duration when seen. Moreover, an intelligent conception of the determining pathological process in relation to its orthopedic concomitants and sequelæ is obviously essential to a rational therapy.

Practically two chief groups of infantile paralyses may be recognized—the spastic, involving the central neuron, and the flaccid atrophic, involving the peripheral neuron. The spastic, namely the cerebral palsies and those due to involvement of the pyramidal tract in the spinal cord, include hemiplegia and diplegia spastica due to cerebral hemorrhage, encephalitis, or congenital malformations, the group of congenital spastic paraplegias, known as Little's disease, and congenital cerebral syphilis.

The flaccid atrophic may be spinal, as poliomyelitis, myelencephalitis, myelitis, occasionally following cerebrospinal meningitis (Oppenheim), from spinal caries, traumatism, or, rarely, as hematomyelia; neuritic, as obstetric palsy, diphtheritic polyneuritis, and peroneal dystrophy; or myopathic, as in the group of myopathic dystrophies typified by the pseudohypertrophic "atrophie musculaire progressive de l'enfance" of Duchenne.

The limits of this short article preclude a detailed consideration of the electrical treatment in each of the above—suffice it to say that in spastic paralyses not much is to be expected from electricity alone. It is in the flaccid paralyses that electricity is of greatest value.

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* Read at the New York Academy of Medicine, Sections on Pediatrics and Orthopedic Surgery, October 16, 1908.

Of the flaccid paralyses the most important and particularly conspicuous of late is acute anterior poliomyelitis, often termed simply "infantile paralysis." In order to understand the rationale and limitations of electrotherapy in this disease, it should be borne in mind that degree and persistence of the paralysis is proportionate to the number of motor nerve cells put out of commission temporarily and permanently. If the neurons innervating a muscle are killed, the paralysis will be permanent absolutely. But the acute disseminated inflammation of the cerebrospinal axis characterizing poliomyelitis, focalizes partly destructively on certain spinal and cranial nuclei in such a varied way as to cause only a functional temporary inhibition of some motor cells, a secondary degeneration of the nerve fibers does not occur, and to that extent recovery from paralysis eventuates.

Now if these paralyzed muscles are properly stimulated by electricity to help maintain their metabolism and nutrition during the period when they are cut off from their neural physiological stimulus, then the recovered neurons are less likely to find an unresponsive atrophied and secondarily degenerated remnant of muscular tissue to act on. The beneficial effects of electricity on the motor neuron itself is open to question. Direct stimulation of nerves or over the spine, while advocated by some, seems to have little evidence in substantiation of its value.

At the Hospital for Ruptured and Crippled I have used both faradic and galvanic currents, faradic in most of the cases, in private practice chiefly interrupted galvanic. Whatever their respective merits may be, I feel convinced that galvanism is preferable to faradism, especially as the response to faradism is lost in most of the muscles paralyzed; whereas, the galvanic irritability is usually increased. A characteristic of the R. D. is that the anode excites a greater contraction than the cathode. Hence Oppenheim favors the application of the positive electrode (anode) over the paralyzed muscle. Gowers, Toby Cohn and others recommend the negative (cathode) here. I have tried both. In so far as my observations go at present, I find no great difference in results—if anything, perhaps, the anode has the better of the argument. The paralyses are of so many degrees and such variable combinations they are seen at such different stages of recovery in children in different stages of muscular development and recuperative power, that conclusive data for comparative results are not easy to obtain, especially as there were other factors helping the natural process of restitution which cannot very well be eliminated or allowed for. For instance, in none of the cases was electricity alone used. Of equal, in some cases of really greater importance, are massage and properly graded special exercises.

The time when electrical treatment should begin is of some importance. Too soon may do harm. Not before the inflammatory process in the cord has subsided, before all irritative phenomena of pain and tenderness have disappeared, should there be any electrical stimulation—in most cases not before the end of the first month. In mild cases earlier, say about the third week.

The duration of treatment is as variable as the paralysis. The greatest improvement has been observed during the first four to six months. After the first year the gain is slight and slow. The fact that without any special therapy there is a natural tendency to a progressive partial recovery, especially during the first few months—showing of the extensive initial paralysis, here a complete recovery of one limb, there total permanent paralysis and atrophy of another, and elsewhere all degrees of paresis—makes it difficult to say how much of a remedial rôle electricity plays in any given case. However, after treating a few hundred patients for a year or so, one may draw a fairly correct conclusion that it has a real value, if properly used, as an important adjunct in the therapy of poliomyelitis, although necessarily secondary to the essential treatment which is orthopedic and surgical in most cases.

2001 Fifth Avenue.

MESENTERIC CYST CAUSING INTESTINAL OBSTRUCTION.—F. Colby (*British Medical Journal,* October 13, 1906) reports the case of a boy of twelve years with acute intestinal obstruction. Abdominal incision revealed a cyst the size of an orange, situated between the layers of the mesentery as they separate to enclose the bowel, and the bowel itself was compressed like a piece of ribbon over the circumference of the cyst wall. The cyst (which contained cholesterine) was shelled out, and the patient made a perfect recovery.—*Medical Record.*

THE SURGICAL TREATMENT OF THE PARALYSES OF EARLY LIFE.*

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The number of cases of paralysis occurring in infancy and childhood which are amenable to surgical treatment is comparatively small, and the majority are better treated by mechanical support, but a certain number of cases derive wonderful help from surgical intervention. Surgery enables some cases to dispense with the use of apparatus altogether, and makes it possible for others to use a much lighter form of support. Surgery may be required either for the muscles, tendons, fascia, bones or nerves. Operations on the skull and brain have not yielded good results and may be dismissed.

In many cases of paralysis certain groups of affected muscles become shortened, especially the flexor muscles when they are unopposed by the constant stretching action of the extensors. This shortening may at times be overcome by manipulation and mechanical stretching, and at other times will require surgical intervention, but can we decide which means to employ? If when the tissue is stretched to its utmost extent, and point pressure applied to it, a reflex spasm is produced, this tissue has been elongated as far as it is possible to elongate it by stretching, and if it is desired to make it permanently longer this must be done by a surgical operation. This point was insisted upon by the late Lewis A. Sayre, and is, I feel sure, a most valuable guide in determining when to stretch and when to cut. I believe in stretching contracted tissues which are capable of being permanently elongated, but know it is worse than useless to attempt this in cases which cannot be stretched. In the majority of cases where we are called upon to elongate contractured muscles it is possible to do this by subcutaneous tenotomy. If the tendon is cut subcutaneously the deformity should be immediately corrected, and if a proper dressing is applied there need be no fear of non-union of the tendons.

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* Read at the New York Academy of Medicine, Sections on Pediatrics and Orthopedic Surgery, October 16, 1908.

I have seen as much as three inches of the Achilles tendon reproduced after subcutaneous tenotomy. In operating upon the tendo-Achillis for example, after the separation of the ends of the divided tendons, a distinct gap is felt between them. This should be covered by a stout piece of adhesive plaster or some dressing firm enough to keep the bandages from occluding the gap between the tendon ends. The space between the tendon ends will be filled with lymph into which new tendon cells will grow until the gap is filled up by new tendon which in a few months time cannot be distinguished under the microscope from the original. If, however, the gap be closed by a tight bandage, it is possible to get non-union of the tendon, and failure to observe that the gap is thus occluded has caused non-union in some cases, and led observers to condemn this method of treatment and advocate other modes of tendon elongation. In the great majority of cases these methods are unnecessarily tedious and much more complicated than subcutaneous tenotomy and productive of no better results. In some instances, however, as in contractures of the long flexors of the fingers, open operation of the forearm tendons is advisable. A number of different operations have been suggested, the best being the splitting of the tendon longitudinally, cutting the slit loose on each side and sliding the flaps on each other. The Z-shaped incision with the opening out of the legs of the Z has also been practiced. In operating upon the hamstrings open incision is usually advisable, as operators have been known to mistake the external popliteal nerve for the biceps tendon and divide it. When operating by the open method at the knee, it has been my custom simply to divide the tendons and close the wound with sutures, making no attempts at sliding elongation. I have never seen failure of the tendon to reform after this operation. The psoas and iliacus should be divided by open operation as their proximity to the femoral artery makes subcutaneous division dangerous.

The question of transplantation of the force of an unparalyzed muscle to a paralyzed one, was first suggested by Nicoladoni, and independently in this country, by Dr. B. F. Parrish, formerly of this city. At the time that I showed a patient before this society, 1892, on whom I had operated at Dr. Parrish's suggestion, by transferring the live tendon of the extensor hallucis to the paralyzed anterior tibial, we both of us supposed the operation original with Dr. Parrish, and it was not until some months afterwards that Dr. Whitman drew the attention of the section to the fact that Nicoladoni had suggested it ten years previously. Nicoladoni operated by transplanting the peronei into the tendo-Achillis while Parrish suggested sewing the extensor propius hallucis to the tibialis anticus.

Tendon transference has been of great benefit in cases of paralysis and will often enable a patient to dispense with apparatus. In order to be practicable we must have a strong muscle whose force can be diverted and made to do the work of its paralyzed neighbor. Unfortunately this condition very frequently does not exist, and all the muscles in the limb are so feeble that it is useless to endeavor to borrow strength from any of them. Occasionally it is possible by electricity and massage, and gymnastics to develop the feeble muscle into a vigorous one, and subsequently operate. Certain details of technique must be observed in order to get the best results in tendon transplantation. If sepsis takes place or if we have pressure necrosis from sutures which are too tight, the result will be a failure. Unless the foot is put in plaster of Paris in a position to relieve the newly attached tendon from strain, the result is apt to be a failure. All the slack must be taken up at the time the tendon is sutured in position, else when the muscle contracts insufficient force will be exerted at the point of attachment. In some cases we may divide the tendon of the strong muscle completely, and attach it either to the tendon of the paralyzed muscle, or in suitable instances to the periosteum of the bone upon which we wish to make traction. It may be wise to drill a hole in the bone and pass the tendon through it to make sure of a firm union. Some writers prefer to split the tendon of the strong muscle using part of it in the way just described, and leaving the rest to perform its own function. In case the tendon is too short to reach the desired point of implantation it can be lengthened by means of a silk cord. In order to be of great use the muscle which is transplanted must be powerful enough to take the place of the one which is paralyzed, and one reason that operations for muscle transference in cases of calcaneus have been so unsatisfactory is because the peronei and the tibials are absolutely inadequate to do the work of the gastrocnemius and soleus. The flexors and the extensors of the forearm have been interchanged, and the sartorius and the hamstring muscles sometimes one and sometimes all have been transplanted to the patella to overcome paralysis of the quadriceps extensor femoris, with great success, and Hunken, of San Francisco, has even suggested the use of muscles of the abdomen and elsewhere, to take the place of paralyzed thigh muscles, transferring their energy by interposed silk threads. With this method I have no practical experience.

The question of nerve transference has been investigated extensively in the last few years, especially since the papers of Spitzy and Young, before the American Orthopedic Association in 1904. The results of nerve transplantation and nerve splicing after traumatic paralysis, have given such remarkable satisfaction that investigators have hoped for brilliant results in cases of infantile paralysis. The theory upon which operations have been based, is, that if a healthy nerve coming from a healthy part of the spinal cord, be attached to the distal extremity of a paralyzed nerve, the latter will still be capable of regeneration and become able to transmit impulse and sensations. Many elaborate demonstrations of the technique of the operations have been made, some of the observers insisting upon the necessity of an end to end anastomosis, and others believing that it is sufficient to cut a slit in the nerve and insert in this the end of the divided nerve, retaining it in position by two or three stitches. I have seen only a few cases where I thought operation indicated, and the results in all I have done so far have been failures. A number of observers have reported brilliant successes, but the results in the cases which I have personally seen, have not appeared as good to me as they did to the gentlemen who had operated upon them, and the failure of exact statement as to the amount of paralysis present before operation, has made comparison of the conditions before and after operation extremely difficult in most of the cases reported. I feel personally that the operation should be tried in suitable cases, but do not feel that it has yet been shown that a nerve which has been paralyzed for a long time can be regenerated by splicing it to a live one. The question of nerve suture and nerve transplantation in paralysis is one of vast importance. It is necessary in discussing its possibilities to recognize that the different kinds of paralysis as we see them in young children have different origins, and unless this is borne in mind operations will be undertaken which have little promise of success.

Brachial palsy of the Erb type is due to overstretching of the nerve roots which results in rupture of the sheath, fibres and vessels of the nerves. From the cicatrization of the resulting hemorrhage and torn sheath then occurs a permanent obstruction to the transmission of nerve impulses. The cicatrices may be single or multiple. The only way to re-establish nerve conduction is to excise the cicatrical area and do an end to end suture of the nerves. A. S. Taylor has reported (*Journal American Medical Association,* Vol. XLVIII, No. 2) a most interesting series of cases of brachial palsy in which he operated. He found in all of them the condition above described, and was enabled to corroborate the conclusions reached from the observation of the lesions in these old cases, by a case of birth palsy in which the lesion was known to have been produced at the time of confinement, and when the child died a few hours later, having in the meanwhile given distinct evidence of a brachial birth palsy. Examination of this case showed an unusually thin strand at the point of junction of the fifth and sixth roots to form the outer cord of the plexus. Microscopically it was found that there had been an incomplete rupture of the perineurial sheath with hemorrhage into the ruptured nerve strands.

For a detailed description of Taylor's operation, I refer you to his article. He draws attention to the thickening of the fascia and of the damaging nerves which are usually of greater density than normal nerves. Taylor says that usually the junction of the fifth and sixth roots is the site of maximum damage, although Putnam thinks it lies at the second or third roots. The thickened indurated areas are determined by palpation and are excised by means of a sharp scalpel. Scissors should never be used for this work.

The nerve ends are brought into apposition by lateral sutures of fine silk involving the nerve sheaths only, while the neck and shoulder are approximated to prevent tension on the sutures. Cargile membrane is wrapped about the anastomosis to prevent connective tissue ingrowth.

Taylor draws attention to the importance of the suprascapular nerve which arises from the junction of the fifth and sixth cervical nerve roots. This nerve innervates the external rotators of the humerus, and in one of his cases failure to appreciate its importance and carefully excise a hard and fibrous spot necessitated a subsequent operation for this purpose which was performed two years later with great gain to the patient.

In one case where the cicatrical area extended almost to the intervertebral foramina it was impossible to bring the ends of the divided nerves into apposition and they were joined by a number of strands of fine chromicized catgut wrapped in cargile membrane. At first the paralysis was worse than before, but after the lapse of eleven months the child had regained such power as had been lost and had some slight additional motion.

The results of immediate suture of nerves which have been divided either accidentally or on purpose, and the bridging of the defects where the nerves could not be approximated, have given such brilliant results that it was to be expected that in cases of traumatic paralysis, like the brachial palsy of Erb, benefit might follow the removal of scar tissue and suturing nerve trunks. In anterior poliomyelitis, however, the condition is different, and the results which are obtained by the experimental transplantation of healthy nerves in animals and of nerve suture after injury in man should not be relied upon as giving reasonable hope that an equally favorable result will follow a similar operation on a diseased nerve.

We now come to the bone operations that may become necessary in paralysis.

When a growing bone is compelled to bear weight while imperfectly supported as is the case in infantile paralysis affecting the lower extremity it very frequently becomes deformed, and in such cases bone operations are sometimes necessary in addition to operations on the soft parts. When the extensor muscles of the thigh and leg are paralyzed, it is often the case that after a club foot has been restored to its normal relation with the leg, it will be found to be everted forty-five or fifty-five degrees on account of a twist which has taken place at the knee so that the knee and ankle joints work no longer in the same plane but at very marked angle to each other, and in such cases an osteotomy of both bones of the leg is sometimes necessary to bring the two into line. At other times a pronounced genu valgum results from the paralysis of the quadriceps femoris and an osteotomy or osteoclasis of the femur is necessary to put the foot under the body and restore the centre of gravity.

By means of thus restoring the balance of the body many cases are able to dispense with apparatus.

In connection with dangle foot or with talipes calcaneus bone operations have been of marked use. Arthrodesis or the formation of an artificial ankylosis is of great use in many of these cases. It is by no means so easy to produce artificial ankylosis that will be stable as would be imagined, and a large variety of operations have in consequence been devised to keep the foot firmly against the leg at a right angle.

The majority make an incision behind the outer malleolus running forward below it and into the instep, dividing the external lateral ligaments and dislocating the astragalus so as to gain access to its top and sides, which are then denuded of cartilage. In the great majority of cases it is also necessary to obliterate the joint between the astragalus and os-calcis and many operators prefer therefore to remove the astragalus altogether.

In order to facilitate the operation, Goldthwaite divides the fibula a few inches above the joint and does this also in order that the divided fibula may be more certainly brought into contact with the astragalus.

The front part of the foot is apt to be unstable in these cases unless the mediotarsal articulation is also obliterated at the same time that the arthrodesis is affected at the ankle joint.

In calcaneus the operation devised by Whitman has given most excellent results. The astragalus is removed, a thin section of bone is then cut from the outer surface of the os-calcis and cuboid. On the inner side the sustentaculum tali is cut away and the calcaneo-navicular ligament is partially separated from its attachments. The cartilage is then removed from the two malleoli and if necessary they are reshaped to permit accurate adjustment. The foot is then displaced backward as far as possible so that the external malleolus may cover the calcaneo-cuboid junction while the inner malleolus is forced into the depression behind the navicular. The peronei tendons which were divided at the first stage of the operation are then attached to the insertion of the tendo-Achillis and to the os-calcis by strong silk sutures. The object of the removal of the astragalus is to assure stability and to prevent lateral deformity by placing the leg bones directly on the foot. The object of the backward displacement of the foot is to direct the weight upon its centre and thus remove the adverse leverage which induces dorsal flexion.

MECHANICAL TREATMENT OF THE PARALYSES OF EARLY LIFE.*

BY WISNER R. TOWNSEND, A.M., M.D.,
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The treatment of deformities due to, or following, paralysis in childhood is a subject of much importance, and to properly present the entire subject in the short time allowed the writer in this symposium would be impossible. It has seemed advisable, therefore, not to attempt the impossible, but to lay especial emphasis on one phase of the subject which has not received its due share of attention, namely, the prevention of deformity.

As poliomyelitis is responsible for more than 75 per cent. of all paralytic conditions in early life, these remarks will especially refer to the deformities following this disease, but they are also applicable to other diseases where paralysis results.

Mechanical treatment for many years has been recognized as of great value in relieving some of the distressing conditions produced by paralysis. Braces of various kinds, plaster of Paris, leather, aluminum, tin, celluloid and many other materials are in common use as agents in this work. The general and the orthopedic surgeon see many deformities and employ various methods in their treatment. Those most familiar with the subject have long recognized that most of these deformities might have been prevented, and it is our duty to do all in our power to teach not only the profession, but the public, that nearly all cases of paralysis may lead to the production of deformities.

One reason why so little has been done in the prevention of these deformities is that in many instances the deformity does not come on until long after the attack, but that it may occur with great rapidity will be clearly shown in this paper. In conditions of great loss of power in poliomyelitis, all the efforts of the family and physician are concentrated on saving life and with more or less complete return to the normal condition, what may happen in a year or so is lost sight of in the rejoicing and in the efforts to overcome the more or less complete or partial disabilities that may then exist.

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* Read before the New York Academy of Medicine, Sections on Pediatrics and Orthopedic Surgery, October 16, 1908.

Many people have an aversion to apparatus, that is very often difficult to explain. Much is made of the facts that apparatus is unsightly; that it attracts attention to the little cripple; that it is heavy and does not cure; that it interferes with the normal growth of the parts and that with it some children do not walk as well as they did without. All of these and many other arguments have had their weight and have undoubtedly been a factor in the failure to prevent deformities. The profession also has been content to wait until deformities occur, either swayed by some of the objections already mentioned or because they have not fully realized how surely they do follow where the paralysis is of certain types.

These types are easily made out, and to them one must always call attention.

Briefly stated it may be asserted that in practically all cases where muscle balance is destroyed deformity follows. The paralysis of the anterior group of leg or foot muscles permits of contraction by the posterior group and a resulting short heel cord and undue stretching of the front or anterior muscles. A paralysis of a muscle on the inner side of the foot as the tibialis anticus permits the foot to be drawn to the outer side when raised and a valgus or flat foot results. This examination into the muscle balance and the study of the muscles affected will enable one to make a much more correct prognosis and to apply a rational and preventive form of treatment. In many instances the paralysis of one muscle in a limb may be more difficult to treat and produce a deformity more rapidly than where an entire group is affected. In fact severe and complete loss of power in all the anterior and posterior muscles going to a foot may be much easier to treat and the patient may get a better result by mechanical aids than where the tendo-Achillis alone is paralyzed. It is these severe cases that are always brought to the surgeon early, the milder cases he rarely sees until late. This is of great practical importance, for it is in the mild cases that surgery and mechanical treatment can be of the greatest value, and especially in preventing deformity.

Much could be said in addition, but as the time is limited, those desiring further information should consult the vast orthopedic literature on this subject.

Brief reference must be made to the rapidity of onset of paralysis after poliomyelitis if we are to impress the profession with the importance of the prevention of deformity. In a paper written for the American Orthopedic Association* it was shown that in 1 case a genu recurvatum had followed in two days after the occurrence of paralysis, another in one week, and a calcaneo valgus had developed in two days. In most instances within three months after an attack, if muscle balance was destroyed, the first signs of beginning deformity could be made out and mechanical treatment was indicated.

In the same article the writer says: "In many instances where the initial paralysis is slight, in the sense, that only one or two muscles of an extremity are paralyzed, as in case of paralysis of the peroneals, many physicians really encourage the formation of deformities by urging exercise of the unaffected muscles, which tends to increase the lack of balance of the various muscle groups. The other muscles may or may not be affected, but if they are unduly stimulated a simple weakness may be transformed into a marked varus deformity. To simply encourage the action of the tibialis anticus, for instance, without regard to the position of the foot during such action, is a most faulty method of treatment. The muscles must be taught to act in the proper and anatomical lines. All stretching of the affected muscles must be avoided. As complete relaxation as possible is desirable, and this also is of great assistance in preventing undue contraction of the non-affected or healthy muscle."

The conclusions in this paper based on a study of over 300 cases of the epidemic of 1907 were: "The majority of cases of poliomyelitis are followed by deformity. The amount of deformity depends on the character of the attack, on the muscles involved and on the treatment. Practically all of these deformities can be prevented by appropriate treatment. Deformities may occur very soon after the attack. The prevention of the primary deformities tends to greater degree of recovery and prevents the secondary deformities. Orthopedic treatment is desirable from the beginning."

The apparatus used at the Hospital for the Relief of the Ruptured and Crippled in New York City was then shown and explained.

Discussion of all these papers on page 939.

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* "The Necessity for Early Orthopedic Treatment in Poliomyelitis," by Wisner R. Townsend, *American Journal of Orthopedic Surgery*, August 1, 1908.

TWO CASES OF HERNIOTOMY FOR STRANGULATED INGUINAL HERNIA IN INFANTS.*

BY ASTLEY P. C. ASHHURST, M.D.,
Surgeon to the Out-Patient Department of the Episcopal Hospital, Philadelphia.

I. John P., aged six weeks, was admitted to the Episcopal Hospital, in the service of Dr. G. G. Davis, March 27, 1907, at 5 A.M. The hernia appeared first at 10 P.M. the night before; it had been impossible to reduce it by taxis. Pain, followed by vomiting and localized tenderness set in, and the baby was brought to the hospital. Operation at 6 A.M. An incision one inch and one-half long was made parallel to, and a little above, Poupart's ligament, exposing the aponeurosis of the external oblique muscle. The hernial sac was then opened, about a dram of clear fluid escaping; the contents of the sac consisted of one coil of small intestine. The color of the gut was reasonably good. The constriction was found at the external ring, and was divided on a grooved director. The hernia had been into a patulous vaginal process of peritoneum. The gut was replaced, and the size of the inguinal canal was reduced by passing three interrupted sutures of catgut through Poupart's ligament, the pillars of the external ring, and the free margin of the internal oblique muscle and the conjoined tendon, without transplanting the cord. Five interrupted catgut sutures were used for the skin. One vein required ligation. A dressing of collodion and cotton was applied, and this was covered with gauze. Before closing the skin the baby was allowed to come out of ether momentarily, so as to determine, by his efforts at crying, whether the closure of the hernial opening was firm. This being found to be the case, the skin was closed. The duration of the operation was twenty minutes.

The baby was sent home with its mother in three hours, and nursing was resumed as heretofore.

Two days later, March 29th, the baby returned to the Out-Patient Department. There was still occasional vomiting. On March 30th it was noted that the bowels had moved for the first time since the hernia became strangulated (three days and a half previously). On April 1st some of the skin sutures had been absorbed. On April 4th it was noted that the wound was solid and that there was no tendency to hernia even when the baby was crying most loudly. The child was kept under observation for over a month and remained in excellent health.

II. Henry G., aged eleven months and ten days, was admitted

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* Read before the Philadelphia Pediatric Society, November 10, 1908.

December 5, 1907, to the Episcopal Hospital in the service of Dr. C. H. Frazier. The patient was a healthy baby, still breast fed. A right inguinal hernia had been present since birth and had always been easily reducible. Six hours before operation it had become irreducible, and there was marked pain and vomiting. Taxis, under chloroform, was attempted without success by the family physician, Dr. David Davis. At 12 midnight, under ether, herniotomy was done; the sac was opened and was found to be continuous with the tunica vaginalis testis ("congenital" hernia); the constriction, which was at the external ring, was divided, and the bowel was found in good condition, being only slightly congested. The only contents of the sac were the cecum and appendix. The latter was 3 inches long, much twisted on itself, and somewhat congested. As the baby was in very good condition the appendix was removed, its stump being ligated with catgut, and then being buried in the cecum. One pulsating arteriole on the cecum, about 2 inches above the base of the appendix, was ligated. On attempting to reduce the herniated cecum, it was found impossible to do so completely, on account of adhesions to the testicle. These were divided, the bowel was replaced, the internal ring was closed with a purse-string suture of chromic catgut, and the floor of the inguinal canal was repaired, beneath the transplanted cord, by a continuous chromic suture uniting the free margin of the internal oblique and the conjoined tendon with the deep surface of Poupart's ligament. The aponeurosis of the external oblique was sutured over the cord, with a continuous stitch of chromic gut; the fat and superficial fascia also were sutured with a separate layer of sutures, as the thickness of the subcutaneous layers was considerable, and it was desired to prevent the possibility of infection by leaving no "dead spaces." Finally the skin was sutured with silk-worm gut, and a collodion dressing was applied. The duration of the operation was twenty-five minutes.

The baby and his mother remained in the hospital for four days, and then were sent home, and the wound was dressed by Dr. David Davis. More than a month after the operation Dr. Davis reported that there never had been "one untoward symptom," and that the scar was firm.

My thanks are due to my chiefs, Drs. G. G. Davis and C. H. Frazier for the privilege of operating on these patients and for permission to report the operations.

The frequency of strangulated hernia during infancy is not generally recognized, but within the last few years the number of cases reported has been gradually increasing. Clogg reports 6 operations for strangulated hernia in infants less than six months old, among a series of 126 operations for hernia of all kinds in children. Telford, in February, 1907, published statistics of 224 operations for strangulated hernia in children less than four years old. I have references to 15 operations reported since the publication of Telford's paper, in addition to the cases mentioned by Clogg, no details of which are given.

Among Telford's collected cases, the exact age was given in 195 cases, 112 of the patients being less than six months old, as is seen in the following table:—

Age in months	1	2	3	4	5	6
Number of operations ..	34	27	24	12	6	9

The 6 cases of strangulated inguinal hernia observed by Clogg, under the age of six months, occurred among 26 operations on children less than six months old; and he notes that in 10 of the other patients less than six months old attempted strangulation had occurred on more than one occasion, and that the hernia had been reduced only with difficulty.

The sex was recorded in 69 of Telford's collected cases, only 3 being female infants. Yet of 3 patients under Kirmisson's care, 2 were female; one boy and one girl were successfully operated upon, and the hernia in the other girl was reduced by taxis.

In the great majority of cases the hernia is on the right side.

The contents of the sac were noted in 104 of Telford's cases. The small intestine alone was present in 83, the cecum and appendix being found in no less than 21 cases (one-fifth of the whole). As the omentum is very slightly developed in infancy, it is not surprising that its presence has not been noted in the hernial sac.

The site of the constriction was noted in 37 cases (Telford); in 26 it was situated at the neck of the sac (internal ring), and in only 11 was it at the external ring.

The appendix was present in the sac in 5 out of the 15 cases published since the appearance of Telford's paper. In Mitchell's and Walker's patients it was not removed, although in the latter it was absolutely rigid from edema. LeBoutillier does not state specifically whether he removed the appendix or not. In Cardazzo's patient, and in my own patient, it was removed.

CASES OF HERNIOTOMY FOR STRANGULATED INGUINAL HERNIA IN INFANCY.

(Reported since February, 1907, when Telford's statistics were published.)

Operator.	Sex.	Age.	Duration of Strangulation	Contents of Sac.	Condition and treatment of bowel.	Result.
Ashhurst	M.	6 weeks	8 hours	Small intestine	Good Replaced	Recovered
Ashhurst	M.	11 months	6 hours	Cecum and appendix	Adherent and inflamed. Appendix removed	Recovered
Bilhaut	—	27 days	24 hours	....	....	Recovered
Cannaday	M.	3 months	Under 12 hours	....	....	Recovered
Cardazzo	M.	24 days	Under 24 hours	Small intestine and appendix	Adherent. Appendix removed	Recovered
Goinard	M.	14 days	12 hours	Small intestine and Meckel's diverticulum	Good. Replaced	Recovered
Kirmisson	F.	1 month	28 hours	....	Good. Replaced.	Recovered
Kirmisson	M.	18 days	Some days	....	Good. Replaced	Recovered
Le Boutillier	M.	7 weeks	24 hours	Small intestine	Gangrenous spot inverted	Recovered
Le Boutillier	M.	12 weeks	8 hours	Appendix	Inflamed	Recovered
Mitchell	M.	6 weeks	12 hours	Small intestine, cecum and appendix	Good. Appendix not removed	Recovered
Nel	M.	5 months	36 hours	Small intestine and ectopic testicle	Gut black but replaced. Gangrenous testicle excised	Recovered
Thomson	M.	29 days	24 hours	Small intestine	Black, but replaced	Recovered
Walker	M.	14 months	Over 24 hours	Lower ileum and appendix	Appendix rigid, but replaced	Recovered
Whitacre	M.	7 weeks	5 days	Small intestine	Perforated and sloughing. Resected, and lateral anastomosis. Next day enterotomy for obstruction. Five days later ileocecostomy	Recovered

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OBSERVATIONS ON ADENOID VEGETATIONS FROM THE STANDPOINT OF THE PEDIATRIST.

BY J. E. HUNT, M.D.,
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Not only the actual existence of adenoids, but the constitutional effects as well, are many times overlooked. In fact, it is surprising how little attention is paid to this condition by the general practitioner; how often he sends his little patient to the laryngologist, only after being urged by the parent, there to receive an opinion which many times simply agrees with that of the sender. Such politeness or professional courtesy is criminal. Only recently I removed an unusually large growth from a boy who was a typical mouth breather. This same boy had spent some time in a laryngologist's chair being "examined." The examination finished, everything was declared to be normal and a strap was advised to be worn at night that the mouth might be kept closed! This may be an extreme case, but by way of preventing a recurrence of such an error, I would respectfully suggest that our laryngologists use their mirrors less and their index fingers more, when dealing with a child's nasopharynx.

There are many problems which present themselves when dealing with adenoids.

Symptomatically it is often very difficult to arrive at a correct diagnosis. Classically, there are the facial expression, the nasal tone, and the nasal discharge to suggest the condition. But a certain number of children exist who are subject to sudden rises in temperature, curious hacking cough, with no evidence of bronchitis and a throat so nearly normal that we do not attribute the difficulty to its proper source. After seeing a number of children through many such attacks and finally in desperation making a digital examination of the nasopharynx only to find adenoids and remove them, I have been surprised to find that with their removal the past trouble was removed also. From such experiences, it seems to me we are justified in concluding that adenoids may exist in quantities sufficient to produce constitutional symptoms without any of the ordinary manifestations.

Just what proportion of children have adenoids has not been determined. Authorities give anywhere from 17 to 65 per cent. Individual tendencies and climatic conditions govern their occurrence to a large extent. There is no question but that the condition is very often a family characteristic. I recall one family in which there are four children, three of whom have had adenoids removed; the fourth, an infant, will probably develop them later. And curiously enough here, as in other families where a number were affected, the various manifestations were about the same within any given group. In the children above referred to the amount of nasal obstruction and thick mucopurulent discharge was astonishing, yet the dental deformity was quite insignificant.

Perhaps the most trying problem in this branch of pediatric work is to determine just how much effect a moderate, or even small, growth has on the general development of the individual child. I recall one boy, very much undersized, thin, anemic, and with a generally lowered vitality. He had only a small adenoid growth, but had a high arched palate and protruding teeth. General measures were instituted with little result, so that it was finally decided to operate. This done and the same measures continued, the child put on 5 pounds within the next three months and his hemoglobin rose from 75 per cent. to 90 per cent.; and at the present time he is well and strong.

Another type which presents many points of interest is the so-called rheumatic child, *i.e.,* one with large tonsils, adenoids, chronic bronchitis (which is only controlled by the salicylates) and the constitutional stunting which goes with chronic conditions at this period in life. Of course, we believe that the point of entrance of this particular infection is through the glandular tissue of the mouth; and as a result of the constant absorption all of the glandular structures become hypertrophied. And it is by their removal that we get our most gratifying results. Still further, I believe that promptness in this respect has saved many an attack of acute articular or cardiac rheumatism.

The period of infancy is ordinarily considered to be free from adenoid difficulty, but as in everything else there are exceptions. I recall one little patient seven months old who had such complete nasal and throat obstruction that it was almost impossible to nurse, and breathing in the reclining position extremely difficult. A general anesthetic was administered and the adenoids thoroughly removed, as well as a portion of both tonsils. After all was done a digital examination was made to assure myself that the nasopharynx was clear. Of course, the symptoms of obstruction immediately disappeared, but within the next year there was a marked return of the adenoids. Following this case and others, although of not quite so tender an age, I have arrived at the conclusion that, where an hypertrophic condition appears so early, no matter how thorough the removal has been, there will be a recurrence in a large majority of cases.

As to adenoids being the direct causative factor in enuresis and epileptoid convulsions, I am still in doubt. My own experience does not bear it out. In every case where I have depended upon this means alone to bring about the desired cure, however hopeful at first, I have been forced to adopt other lines of treatment. But we cannot deny that in a certain percentage of these epileptoid cases this operation does make an impression; but would not any other procedure involving shock give us the same? A similar question arises in regard to enuresis, for it has been noted that the most obstinate cases have responded to lumbar puncture and the administration of normal salt solution. Of course the only possible effect here would be the shock attending the operation. However, where adenoids are coexisting with any such constitutional conditions, they should be removed. But to depend upon their removal as positive cure, is, I believe, beyond our clinical authority. At present the lay mind is beginning to appreciate the pernicious effects of adenoids. And this fact makes it all the more necessary for us to be conservative in our statements as to what should be laid at their door. What we are after is healthy children, and, generally speaking, a child with adenoids cannot be so. Their prevalence we are recognizing, let us more generally advocate their removal.

317 Argyle Building.

STUMPF'S CLAY TREATMENT AND ITS USE IN METEORISM AND DIARRHEA.—Görner (*Münch. Med. Woch.*, November 26, 1907) has tried the "clay broth" recommended by Stumpf in a large number of cases of acute enteritis and gastritis of fermentative origin with great success, vomiting and diarrhea usually ceasing after the first dose (100 gm. fuller's earth suspended in 200 ccm. water). After the second dose the cure was completed. In chronic diarrheas, as in tuberculosis of the bowel, cancer, etc., the diarrhea and meteorism were easily controlled, though no action on the underlying process was to be expected. In the meteorism of typhoid it has also been beneficial. The author has several theories to explain the action of the drug, but none seems adequate.—*Boston Medical and Surgical Journal.*

REPORT OF A CASE OF INFANTILISM (LORAIN TYPE).*

BY A. HYMANSON, M.D.,

Adjunct Attending Physician (Children's Service), Beth Israel Hospital, New York.

Nathan Fl., fifteen years old, was born in Russia, and brought to America when two and one-half years old.

Family History—His mother is forty-six years old; father, forty-eight. They are not related, and they have always been healthy. There has been no syphilis nor tuberculosis in the family. The mother gave birth to five children, four of whom are in perfect health. The youngest is not yet ten years old.

Previous History—The boy was born at full term and fairly well-developed. Labor was normal, no forceps were used. He was nursed by his mother until he was two years old. He was able to sit up when eight months old, and cut his first tooth when nine months old. He commenced to walk at fourteen months, and talk at eighteen months. He was subject to mild attacks of bronchitis and tonsillitis, still he never had convulsions. He grew and developed just as any other child would, until he was about six years old, when he had a very mild attack of measles. About one year later the mother noticed that the development of the child was not proceeding naturally. She took him to some dispensary to ask medical advice. Medicine was given him for a few months but no improvement was seen.

He was placed under my treatment in the beginning of September, 1902. He was then twelve years old; he measured 39½ inches in height and weighed thirty-four pounds. The circumference of his head was 18 inches, that of his neck 10 inches, and his chest 21 inches. He at once impressed me as belonging to some type of dwarfism. At first three grains of thyroid extract was administered daily, the dose being gradually increased to fifteen grains, this was kept up for about fifteen months. This increased his height by three quarters of an inch, the circumference of his chest by 3 inches and his weight by four pounds.

This treatment had to be discontinued, as he occasionally suffered from severe headaches, dizziness and nausea. I then kept him for about fourteen and one-half months on different tonics, such as arsenic, hypophosphites, iron, iodids and cod-liver oil. He gained 1¾ inches in height and 5 pounds in weight.

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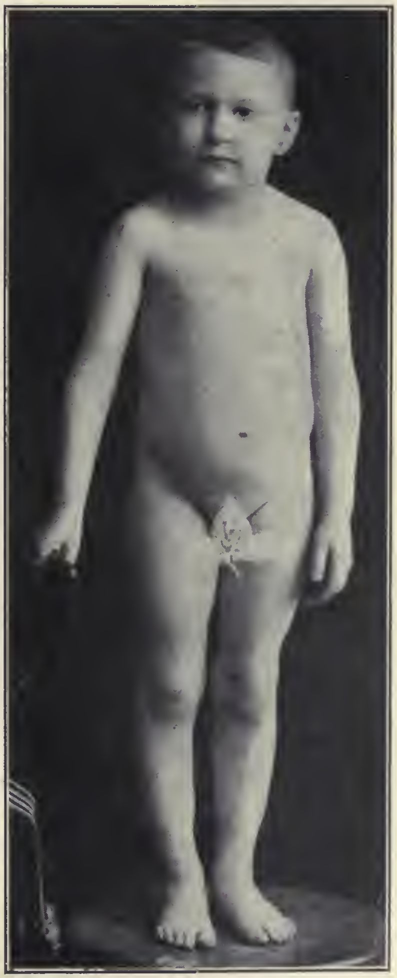
* Case was presented before the Eastern Medical Society, two years ago, and was alluded to in the discussion of the paper on Infantilism, by Dr. H. Schwarz, at the Section on Pediatrics, New York Academy of Medicine, May 14, 1908.

Although the boy is at present fifteen years of age, he is a dwarf in size, his height being 3½ feet, his weight 41 pounds. According to Rotch and Holt, a boy of his age should measure 63 inches in height and weigh 110.8 pounds. His head is somewhat flat, and there are protuberances on the occipital and parietal bones. The circumference of his head is 19 inches. The root of his nose is somewhat flattened and the lobe somewhat depressed. He has a short neck, the thyroid gland cannot be palpated. His chest is covered with a great quantity of adipose tissue, the circumference at the nipples being 23 inches. The circumference of his body at the umbilicus measures 21½ inches; the pelvis at the crest of the ileum 22 inches; his genitals are infantile in development, the pubic and axillary hair are wanting. There is no marked rachitis present. His hair is soft and it grows; his skin is supple; his hands are not too large; his nails are somewhat club shaped; no myxedematous swelling is evident. A skiagraph of the hand was taken and it does not show back-



INFANTILISM.—Boy, 15 years of age. (Lorain Type.)

wardness in the appearance of the nuclei of the carpal bones epiphyses and metacarpals and phalanges. His abdomen protrudes somewhat; his muscles are not weak; his reflexes are present.

His sense of hearing is in some degree impaired; he is near-sighted, although there is no special defect in his optic nerve; the rest of his senses are normal. He is quite intelligent; nevertheless, he did not attend school until he was ten years old, as he was not admitted at an earlier age on account of his small stature. He learns at school quite well.

He is both timid and emotional, and becomes angry at the slightest provocation. He is very aggressive, and when in this state he is either apt to break whatever he finds within his reach, or chews and tears his clothing. The expression of his face is childlike in its simplicity; his mother says that he sings well. His heart is somewhat small in size and the heart sounds are feeble and his pulse is weak. No murmurs present. At times he has severe attacks of headache at the frontal and temporal region, which last a few hours.

It seems that the thyroid treatment did not produce a very marked effect in this case. During the fifteen months this drug was used the boy gained but ¾ of an inch in height, whereas, during the space of time no thyroid was used he gained 1¾ inches.

Dr. Meige, in *Gaz. des Hop.*, 1902, classifies the subject of infantilism into two varieties—the myxedematous and Lorain type. In the first, deficient or abnormal function of the thyroid gland is always present. This affection may be congenital or acquired. The thyroid lesion sets up a specific autointoxication and causes a retrogression of the mental and bodily activity of the patient. There is an arrest of development and ossification. There is backwardness in epiphyseal growth. Second dentition is often retarded or absent. There is dystrophy of the genital organs, the face is chubby, the lips prominent, the nose small and the hair fine. The abdomen is usually prominent, the genital organs are rudimentary. The voice is high-pitched and the thyroid gland is usually small. There is a long continuance in the juvenile state of the body and mind.

In the Lorain type, there is a defective arterial development (anangioplasia) which causes insufficient nourishment of the tissues. The epiphyses are found to be normally united. The stunted growth is not due to defective ossification, but to its premature occurrence. The pubic and axillary hair is wanting. Intelligence is fair. The first is due to thyroid insufficiency, the second is part of a general process of defective nutrition, which may be associated with hereditary syphilis, tuberculosis, alcoholism and various infectious diseases. Postmortem evidence on this subject is not abundant, but Brissaud, of Paris, has found the thyroid gland rudimentary in one autopsy.

A skiagraph of the hand is of great importance to differentiate the myxedematous from the Lorain type. If we find that there is a deficiency in the appearance of the nuclei of the carpal bones, and there is a failure of the metacarpals or phalanges to unite, then the case belongs to the myxedematous type and the thyroid treatment is indicated; but in the Lorain type, where ossification is premature, the thyroid treatment is of no value.

135 Henry Street.

FRESH AIR IN PNEUMONIA.—T. W. Kilmer (*Journal of the American Medical Association,* July 25, 1908) reports the results of the fresh air treatment in 16 cases of lobar pneumonia and 20 cases of bronchopneumonia in dispensary babies. Nearly every clinical type was represented, from mild to very severe, and the diagnosis was positive in every case. Many of the parents were ignorant, but willingly followed instructions and carried out the treatment surprisingly well. The treatment of both lobar and bronchopneumonia in these cases consisted in giving an initial purge (castor oil or calomel); mustard poultice to the chest; sponging to reduce fever; cutting down diet to one-half strength; hygiene of body, clothing, and sickroom, etc.; light expectorant every two hours for six to eight doses in twenty-four hours; keeping the gastrointestinal tract clear; abundance of fresh air; rest. One patient died, but not until the mother had insisted on taking the baby to a hospital; it is, nevertheless, included in the series. This makes the mortality 2.77 per cent., which is remarkably low for either private or hospital practice. The study, Kilmer thinks, shows conclusively that, by a combination of simple instructions to parents, and quiet, rest, proper food, and, above all, fresh air for the child, the mortality of one of the most serious diseases of infancy can be greatly reduced.—*Medical Record.*

ARCHIVES OF PEDIATRICS.

DECEMBER, 1908.

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Contributors and Correspondents, see page III.

THE PARALYSES OF EARLY LIFE.

At a joint meeting of the Section on Orthopedic Surgery and the Section on Pediatrics of the New York Academy of Medicine held in October, there was a symposium and discussion on the very important topic of the paralyses of early life. The papers presented are published in full in this issue of ARCHIVES OF PEDIATRICS and will well repay careful reading. In the discussion which followed, the additional point was brought out that the mechanical treatment by means of apparatus of the Zander type, if intelligently prescribed and carried out, is of the greatest value in improving function. Even cases that have had long standing reaction of degeneration seemed to be improved, for there is a growing belief that an unfavorable electrical test is not absolute proof that the nerves and muscles have lost all chance of regaining some of their functions. In other words, there is present in the paralyzed limbs a power for recovery which seems to escape detection by electricity.

The prevention of deformities by contracture is of the greatest importance in every case, and it should be the duty of physicians who see such patients to adopt suitable means, whether by braces, plaster, other apparatus, or by tenotomy, to overcome spasm and to prevent or correct contracture. After this is done mechanotherapy and home gymnastic training can usually effect most satisfactory results.

CONGENITAL PILES.—J. V. Milward (*The Lancet,* June 1, 1907) reports 3 cases in which a pile-like condition was noted from birth. Patient I. was a male child, aged eleven weeks. There was a tumor of the size of a large pea, soft in structure and not inflamed, situated at the anterior margin of the anus, its posterior margin being flush with the anal canal. The latter was slightly narrower than normal, and I dilated it with the finger. The mother stated that the little lump had been present since birth and was giving the child pain. It was removed with scissors. Patient II. was a female, aged four months. The tumor was situated in the same place as in patient I. and was of about the same size. It was partially destroyed by ulceration and was somewhat indurated for the same reason. No stricture of the anus was present. The growth was snipped off. Patient III. was a female, aged eleven weeks. The pile was in the same place and was of about the same size as in the other two cases. Its structure was perfectly healthy and consisted of fibrous and adipose tissue. The author regards these small masses as rather of the nature of a malformation than an outgrowth originating in a dilated venous radicle.—*Journal of American Medical Association.*

Bibliography.

CONSUMPTION: ITS PREVENTION AND CURE WITHOUT THE USE OF DRUGS, by CHARLES H. STANLEY DAVIS, M.D., Ph.D., member of the New Haven County Medical Society, Connecticut State Medical Society, American Health League. Second edition. Enlarged. Cloth, pages 218. E. B. Treat & Co., New York. 1908.

The second edition of this useful little book appears with the addition of chapters on Bovine Tuberculosis, The Use of Milk, General Tuberculosis, Marriage and Offspring, and a list of the institutions in the United States where tuberculosis patients are received. Written primarily for the lay reader, this book is very opportune, presenting the most recent known facts about the Great White Plague in a manner easily understood by the average reader. Emphasis is given to the inadequacy of drugs in combating tuberculosis and to the necessity of hygienic measures both in health and illness. It should prove of great value in disseminating the right sort of knowledge about this disease.

TABER'S POCKET ENCYCLOPEDIC MEDICAL DICTIONARY, edited by CLARENCE W. TABER; Associate Editor, NICHOLAS SENN, M.D. Second edition, pages 418. C. W. Taber, Publisher, Chicago.

This little volume combines in pocket form the medical dictionary and the medical cyclopedia with considerable success. A great deal of care has been given to the arrangement of the book and a system of cross indexing incorporated so that all words pertaining to a certain subject may be found by referring to that subject. Tables of equivalents, prefixes and suffixes, weights and measures; analyses of food stuffs and a synopsis of the medical practice laws of the various States increase the usefulness of the work.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Abstract of Record of Meeting, held October 16, 1908.

DR. CHARLES OGILVY AND DR. GODFREY R. PISEK, PRESIDING.

This was a joint meeting with the Section on Orthopedic Surgery, and the evening was devoted to a consideration of

THE PARALYSES OF EARLY LIFE.

THE CAUSATIVE FACTORS.

DR. ROYAL S. HAYNES read this paper. (See page 897.)

THE DIFFERENTIAL DIAGNOSIS.

DR. E. G. ZABRISKIE read this paper. (See page 904.)

THE ELECTRICAL TREATMENT.

DR. T. H. ROMEISER read this paper. (See page 912.)

THE MECHANICAL TREATMENT.

DR. WISNER R. TOWNSEND read this paper. (See page 922.)

THE OPERATIVE TREATMENT.

DR. R. H. SAYRE read this paper. (See page 915.)

DR. HENRY LING TAYLOR said that in the treatment of the acute attack of anterior poliomyelitis it was exceedingly important to keep the patient quiet and in bed and to refrain from meddlesome interference. Massage and electricity were contraindicated during the first month. The deformity could be prevented in nine-tenths of the cases by the application of suitable splints. After the acute stage the nutrition could be kept up by the use of the vibrator and of dry heat. It was also very important to enable helpless children to walk by the aid of proper appliances, and to relieve instability and deforming strain in them and in children who could walk, by orthopedic treatment. Protected locomotion was perhaps the best stimulus to nutrition. These means, when properly used, were, in his opinion, superior to electricity and massage.

Dr. Henry Koplik said that it was well known that in making a differential diagnosis between meningitis and polioencephalitis a case must often be under observation for twenty-four hours before the diagnosis could be cleared up. There was nothing more difficult to determine than the moment when cases of poliomyelitis should be placed in the hands of the orthopedic surgeon. Sometimes deformities occurred when the child was too sick for operative procedures.

Dr. Sara Welt-Kakels pointed out that it may be difficult to distinguish an anterior poliomyelitis from a birth palsy, or even from pseudoparalysis dependent upon rachitis or lues. She recalled a case of *paralysie douloureuse* occurring during the epidemic of anterior poliomyelitis. Here the child had been held up by the left arm when he stumbled and soon was noticed not to move it. In this instance, placing the member in a sling for a few days resulted in a cure.

Dr. Louis Curtis Ager believed that every physician who saw the patient early could prevent deformity in cases of anterior poliomyelitis in 95 per cent. of the cases. He should prevent the contraction of the muscles and should support the weakened muscles of the opposite side.

Dr. L. E. La Fétra believed, with regard to the treatment, that much could be done in the acute stage, although Dr. Taylor advised letting the patients alone. Dr. La Fétra thought so too, so far as the use of electricity, massage and manipulation were concerned. There were many cases in which the use of massage was extremely painful. There should be absolute rest, so far as the limbs were concerned. But a great deal could be done by hot baths and by the application of spinal ice bags, or counter-irritation to the spine by the use of mustard and hot fomentations. This would relieve the pain from the spinal nerve roots. These pains had been very marked during the recent epidemic. He believed that, in most cases, deformity could be prevented by beginning the proper treatment at once, at least to place the feet at right angles at the beginning of treatment and keep them there.

Dr. Walter Lester Carr believed that much could be done in the early stages of anterior poliomyelitis to relieve pain and other symptoms. He began early a general orthopedic treatment by strappings of adhesive plaster to keep the weakened muscles in their proper position. Too often physicians failed to recognize the necessity for early and continued treatment, and the cases passed from their hands to the care of orthopedic surgeons without having been given more than general medicinal treatment. All such cases required a supervised management over a long period by both physician and surgeon.

DR. WILLIAM M. LESZYNSKY said that for the improvement of paretic muscles, more could be accomplished by the systematic practice of voluntary movements than by any form of electricity. If the muscles were completely paralyzed, massage and electricity might develop them while the undestroyed centers were undergoing regeneration.

DR. JACOB TESCHNER said that he did not believe in the use of massage or electricity, nor in confining a paralyzed limb by means of a brace. In his operative cases, he insists on the full use of the operated limb as soon as the ability of the patient permitted.

DR. HENRY FRAUENTHAL took issue with the statement that mechanical massage was preferable to that given by skilled hands, believing that the skilled masseuse was far better able to perform active and passive massage than any machine.

EMPYEMA IN NURSLINGS.—Douriez (*These de Paris, Arch. Enf.*, November, 1907) shows that purulent pleurisy is not exceptional in nurslings. It is secondary to pulmonary infections. The pneumococcus is the principal agent in the place of the streptococcus, which plays the principal rôle in the empyema of the newly born. The diagnosis is to be made only by the subjective signs, the most important physical sign being flatness on percussion. Exploratory puncture often establishes the diagnosis and permits a bacteriologic examination. Difficulties in diagnosis arise with reference to the distinction between bronchopneumonia or even lobar pneumonia or pulmonary tuberculosis. The prognosis is always grave; practically always fatal in streptococcal empyema, not quite so bad in the pneumococcus empyema. Treatment should consist, at first, in thoracentesis, which may be repeated in the pneumococcus empyema. Rib resection in the nursling is a distinctly dangerous operation and should not be resorted to unless other means fail.—*Interstate Medical Journal.*

THE PHILADELPHIA PEDIATRIC SOCIETY.

Abstract of Record of Meeting, November 10, 1908.

J. P. CROZER GRIFFITH, M.D., PRESIDENT.

HEREDITARY SYPHILIS.

Dr. Theodore Le Boutillier presented 3 cases, two infants of five months and a child of three years. In the first infant there was a history of coryza with scaling of hands and feet when two weeks old. He now shows depression of bridge of nose, enlargement of all glands, including epitrochlear and suboccipital glands, and dilated, tortuous and prominent veins of the skull. The two others are brothers. The infant had a typical eruption on head and extremities and a mucous patch on tongue. The older child showed a large, square head, enlarged liver and mucous patches on tongue and hard palate. There are also condylomata about the anus; and all glands are enlarged. Dr. Le Boutillier also reported the history of a fourth case, of late hereditary syphilis, showing gumma in the spinal muscles of the right side at the level of the last dorsal vertebra, and enlargement of the right elbow joint which went on to necrosis of the bones and abscess formation. Both conditions improved under treatment, but the boy died later of typhoid fever.

Dr. Alfred Hand, Jr., noted the absence of fissures of the anus in these cases. He has always considered fissures of the mouth of considerable value in making the diagnosis, but the appearance of fissures of the anus is so common in athreptic infants that he hesitates to use antisyphilitic treatment in the absence of other signs of congenital syphilis.

Dr. A. H. Davisson referred to an infant seen first at six months of age, in whom rhagades of the mouth and anus were marked; dactylitis of several fingers was pronounced, and enlargement of the liver was present. With calomel, and mercurial ointment these symptoms disappeared. In a child with what was apparently a sprained wrist, whose father was known to have had syphilis and whose mother was under specific treatment during pregnancy, recovery was only brought about when the wrist was placed at rest and specific treatment instituted.

Dr. J. C. Gittings said that it was his custom to employ mercurial ointment in cases of infantile atrophy whenever there was even a slight suspicion of syphilis and that he had never seen any pronounced ill effects from a therapeutic trial. Daily weighings will quickly demonstrate its benefits and the failure to gain weight or a continuance of loss after ten days or two weeks trial would indicate either the non-specific nature of the atrophy or that the luetic infection had produced irremediable somatic injury.

Dr. D. J. Milton Miller referred to Jacobi's remarks upon the success achieved by old-time physicians by the use of mercury in wasting infants, because so many of the children treated were syphilitic. Dr. Miller said that he had noted fissures about the anus in infants with no suspicion of syphilis. Without the presence of other signs, such fissures are not alone evidence of syphilis.

Dr. Le Boutillier said that he considered mercury indicated in all infants in whom fissures of the anus are found, as it can do no harm; and, on the other hand, if the cause of the condition were syphilis, it would do much good.

IMPERMEABLE STRICTURE OF THE ESOPHAGUS.

Dr. A. P. C. Ashhurst reported the case of a negro boy, aged two and one-quarter years, who had swallowed lye eight weeks before admission to the Children's Hospital. For two weeks he could swallow liquids only. Bougies, even filiform, reached only 5 inches from the dental margin. Dr. Ashhurst performed Stamm's gastrostomy, the operation lasting forty-five minutes. The child gained in weight regularly, taking food through the gastric tube. Four months later he died of acute pneumonia.

Dr. H. R. Wharton said that he would have practiced retrograde catheterization in this case, but the child was too ill. In another case this procedure had been successful. When the child was seen, some years later, the gastrostomy wound had healed and the child was taking solid food with apparent comfort. While other methods have been successful, Dr. Wharton prefers retrograde catheterization in favorable cases. Most of these cases of impermeable stricture of the esophagus result from swallowing lye.

STRANGULATED HERNIA IN INFANTS.

Dr. Ashhurst reported 2 cases of strangulated hernia. (See page 925.)

Dr. J. H. Jopson had operated upon a baby of five weeks, with a lump in the left groin, stated to have appeared only on day of operation. Incision showed a suppurating gland, which must have been enlarged several days.

DR. E. B. HODGE said that he had operated on 2 cases of strangulated hernia in infants. One was a male, aged six weeks. The sac contained only small intestine. This patient died in twenty-four hours. The other was a girl two months old, operated for strangulated hernia of the right tube and ovary, with recovery. This case was reported before the Philadelphia Academy of Surgery October 1, 1906.

DR. J. P. CROZER GRIFFITH said it was strange that, with the great number of cases of hernia in infants, strangulation was not seen more frequently. Unless an examination of the whole body was made such cases may easily lead to error.

IMPERFORATE RECTUM AND ANUS.

DR. J. H. MCKEE reported 3 cases of imperforate rectum and anus. Dr. Jopson had operated upon 2 of these cases.

DR. WHARTON said that the most favorable of these cases are those with atresia of the anus or of the lower end of the rectum. Next come the cases of rectovaginal fistula. In the latter, if bowel movements pass freely through the rectovaginal fistula, operative treatment may be deferred for some time. The most unfavorable cases are those in which the rectum terminates in the bladder or urethra. Of all operations for imperforate rectum and anus, Dr. Wharton considers the perineal operation the best.

A STUDY OF THE BLOOD IN PERTUSSIS.

DR. J. A. KOLMER read this paper by invitation. He had studied the blood in over 100 children, 27 of them having pertussis, and concluded that there is certainly present early in pertussis a leukocytosis which affects mainly the small lymphocytes, and that these changes are characteristic, serving in a great many cases to diagnose pertussis before such diagnosis can be made from the clinical symptoms. In many instances a provisional diagnosis should be made and re-examination of the blood later will clear up all doubt. While the method may consume too much time for the general practitioner, it will be of great value in institutions, to prevent the spread of an epidemic of whooping-cough.

DRS. C. A. FIFE, J. M. CRUICE and MILLER discussed Dr. Kolmer's paper.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. E. C. FLEISCHNER.	DR. M. NICOLL, JR.
DR. A. F. HESS.	DR. G. R. PISEK.
DR. HENRY HEIMAN.	DR. S. W. THURBER.

PATHOLOGY.

SENDZIAK, JOHN: ATROPHIC RHINITIS. (*Annals of Otology, Rhinology and Laryngology*, December, 1907, p. 814.)

This is a very comprehensive article, with 452 references to literature. Several forms are recognized and the term ozena is synonomous. Moure distinguishes five forms—adenoid, sinusal, necrotic, purulent and atrophic. The first and fourth are seen most frequently in children. It is defined as a chronic catarrh of the nose, not having an ulcerative or destructive character, which may spread to the pharynx or larynx, and which differs from simple chronic catarrh by a more or less thick, quickly-drying secretion, leading to the formation of crusts which are characterized by a very strong, disagreeable, specific odor, and by atrophy of the mucous membrane and bones of the nose.

The symptoms include the characteristic fetor, which once smelled cannot be forgotten, loss of smell to varying degree, nasal obstruction to crusts, dryness of nose and throat, epistaxis, ear and eye disturbances, including frequent infection of lachrymal duct, headache, vertigo, aprosexia commonly associated with adenoids, asthma, nasal speech.

Adenoids were found in 5 per cent. of the cases; hypertrophied turbinates in over 5 per cent. The majority of authors believe that atrophic rhinitis is the result of the hypertrophic form; the author has seen this transition in some cases; hypertrophy of the tonsils and deviations of the septum are seen and the atrophy always begins in the wide side of the nose in a case of deviated septum; dry pharyngitis and laryngitis are common and 14.5 per cent. had ear complications, general chronic purulent otitis media.

The author does not believe that sinus disease is the cause of atrophic rhinitis as does Gruenwald.

As a help to a clinical diagnosis, the presence of Loewenberg-Abel's bacillus mucosus and the cornification of the epithelium are confirmatory microscopic proofs.

Spontaneous recovery is possible, but the prognosis, in the great majority of cases, is bad, as far as cure is concerned. With patience and perseverence the chief, and objectional, symptoms may be made to disappear. There can be no regeneration of the atrophied mucous membrane.

Treatment is to be twofold—general and local. Prophylactic measures are most important in childhood. They are suitable nutrition, gymnastics, sports, fresh air, avoidance of excessive mental work. Iodid of iron internally is recommended.

The local treatment may be summed up as cleansing and stimulating. No one drug is a specific for local use. Vibratory massage is especially mentioned as used in the nose with medicated cotton swabs. S. W. THURBER.

MEDICINE.

KNOEPFELMACHER, W., AND LEHUDORFF, H.: THE WASSERMAN BLOOD SERUM REACTION IN THE MOTHERS OF CHILDREN WITH HEREDITARY SYPHILIS. (*Mitteilung. der Ges. für Inn. Med. und Kinderhk. in Wien,* March 5, 1908.)

The authors examined the blood serum of 14 mothers whose children had hereditary syphilis, but who themselves had never had specific trouble and had never been treated for the disease. The technic used was that described by Wasserman, and the result was positive to a greater or lesser degree in every case. If the reaction is an absolute sign of syphilis, as is apparent from the work of many investigators, then these few cases, while not allowing positive conclusion on account of their paucity, point strongly to the conclusion that the mothers of syphilitic children have had, or have, syphilis, even though they have never had any symptoms of the disease. E. C. FLEISCHNER.

REICHE, A.: THE DIAGNOSTIC VALUE OF PALPABLE EPITROCHLEAR GLANDS IN INFANTS. (*Monatschrift für Kinderhk.,* January, 1908, p. 511.)

The epitrochlear glands drain the superficial structures of the hand and forearm, not the bones and deeper structures.

Two hundred and thirty-five children were examined; of these 13 suffered from undoubted syphilis; 9 of these children (with congenital syphilis) had palpable epitrochlear glands. Ten other children were suspected of having syphilis, and in 2, the subsequent history proved that the suspicion was justified. In neither case were the glands palpable. In the remaining 8 (suspected cases) glands were present in 2.

Among the 212 children in whom there was no reason to suspect the presence of syphilis, there were 28 breast-fed infants. Three of these infants had palpable epitrochlear glands. The remaining 184 children were mostly poorly nourished and delicate. With few exceptions, cervical, axillary and inguinal were palpable. In only forty were the epitrochlears palpable.

Conclusions to be drawn from these observations are as follows:—

(1) Palpable epitrochlear glands are frequently seen in syphilitic infants, but may also be present in other conditions, such as local inflammatory processes.

(2) Palpable epitrochlear glands may be regarded as a confirmatory sign of congenital syphilis; they are not pathognomonic of this disease. HENRY HEIMAN.

KOEPPE, H.: HIRSCHPRUNG'S DISEASE. (*Monatschrift für Kinderhk.*, January, 1908, p. 496.)

The clinical observation and postmortem examination of a patient suffering from this somewhat rare disease leads the author to discuss the pathogenesis of the disease. In the author's case, constipation set in soon after birth; this symptom was intermittent in character. There were also present attacks of marked abdominal distention. On rectal examination a spasmodic stricture was found high up in the rectum, which yielded to gradual dilatation with the finger. Dilatation of this stricture always resulted in relief from an attack of constipation. Death resulted from a perforation of the sigmoid flexure. At autopsy there was found a marked dilatation of the colon with moderate hypertrophy of its walls, and moderate dilatation of the upper part of the sigmoid flexure.

The author thinks that the hypertrophy of the colon could readily have resulted from the stricture in the rectum, and that it was probably not congenital in character. The marked constipation, which was intermittent in character, he likewise attributes to the spasmodic stricture. A digital dilatation always relieved constipation. This case supports the view held by many observers, notably Fenwick, that the primary cause of the disease is of a mechanical nature. That a stricture is not always found postmortem does not militate against this view, for the stricture may be of a spasmodic character, which gives no evidence of its existence on postmortem examination. HENRY HEIMAN.

WINOCOUROFF, J.: A CASE OF INTESTINAL OBSTRUCTION, CAUSED BY ASCARIS LUMBRICOIDES IN A SIX-YEAR-OLD GIRL. (*Centralb. für Kinderhk.*, May 1, 1907, p. 149.)

When first seen, the patient presented the following symptoms: The abdomen was markedly distended and sensitive to touch; when moved the patient was seized with uncontrollable vomiting.

She had been in good health up to one month before her admission, when she had been seized with sudden vomiting, a large number of round worms being found in the vomitus, and on the next day, also, in the stools.

Since then, she had had pains in the lower abdomen, and cries out at night. The movements have been normal, with no worms present in the stools. On the day before admission she had had persistent vomiting and fever; the pain in the abdomen had been very severe and there was much distention. The child was poorly nourished; temperature, 38°; pulse, 120.

Two finger breadths below the umbilicus was made out an irregular mass and similar ones on each side of the umbilicus. Three days after admission santonin and calomel were given and, in spite of vomiting shortly afterwards, sixteen worms were passed on the next day, after which the distention diminished. Injections of solutions of resorcin into the bowel was followed by the passage of 110 round worms, in the period of five days, after which the patient made an uneventful recovery.

M. NICOLL, JR.

SURGERY.

REDARD, P.: THE IMPORTANCE OF TENDON TRANSPLANTATION. (*Centralb. für Chirurg. und Mechan. Orthop.*, January, 1908, p. 5.)

Tendon transplantation is indicated in flaccid paralyses, whether of central or peripheral origin, if the paralyses is not a complete one, and if the operator can locate a thoroughly healthy muscle to transplant. It is especially valuable in paralytic talipes equinovarus. The operation is contraindicated when the paralysis involves a large number of muscles, so that as a result of the surgical procedure one can only expect an unsatisfactory fixation without an improvement in function.

Periosteal transplantation is to be preferred to the joining of tendon to tendon, if the tendon of the paralyzed muscle upon which the transplantation is to be made, has very little resisting power, and if the union cannot be made in a location which is near the periosteal insertion of the paralyzed muscle. It is likewise indicated if one can find on the skeleton a location where the function of the transplanted muscle will be more easily carried out than if it were joined to the diseased tendon, and, lastly, if one desires to restore pronation and supination in deformities of the foot.

The operation is not to be advised in Little's disease, or in the various spastic affections. In these cases tenotomy should always be preferred. E. C. FLEISCHNER.

HYGIENE AND THERAPEUTICS.

TOWNSEND, CHARLES W.: THE USE OF FAT-FREE MILK IN INFANT FEEDING. (*Boston Medical and Surgical Journal,* March 19, 1908, p. 379.)

Recent researches seem to disprove the generally accepted assumption that it is the proteid in cow's milk and no other constituent that produces digestive disturbances in infants. In fact, some recent observers, among them Walls, claim that the proteids of cow's milk are easy of digestion. The fat of cow's milk was assumed to be of the same chemical nature as that of human milk, but Stern has proved that there are important differences. The fat of cow's milk contains more volatile acid, such as butyric acid. Luzzatti and Biolchini have also shown that the fat splitting ferment in human milk is more active.

Excess of fat in an infant's food often produces gastrointestinal indigestion, cessation of gain in weight, and in some cases infantile atrophy. It is often a cause of constipation, just as too little fat. The stools become hard, dry, greyish-white in color, with numerous curds. The author fed all the babies suffering from gastrointestinal disturbances at the Boston Floating Hospital with fat-free milk, plain or diluted with barley-water.

New cases were given calomel or castor oil and varying dilutions of fat-free milk and barley-water. In one-third of the cases the milk was diluted ten times with barley-water. In the other cases, half milk and half barley-water or undiluted fat-free milk was given. Eighty-five cases were thus treated. Undiluted fat-free milk was well borne, even by the very youngest infants. The stools assumed a characteristic appearance. They were yellowish-brown in color, smooth, salve-like, somewhat opalescent, and free from curds.

Fat-free milk can be obtained by means of the centrifuge only. In most cases this is not necessary, as nearly all the cream can be removed by the Chapin dipper. This will yield a milk containing a little more than 1 per cent. fat. In mild cases of gastro-intestinal disturbances whole milk, or a milk from which the top 2 or 3 ounces have been poured off, should be used.

His recent experience with this method of feeding leads the author to draw the following conclusions:—

First, excess of fat may cause constipation, curdy stools, convulsions, rickets and infantile atrophy.

Second, in gastrointestinal disturbances it is desirable to exclude fat from the diet.

Third, the proteids of undiluted fat-free milk are remarkably well borne, even by the youngest infant. HENRY HEIMAN.

SIOR, L.: TREATMENT OF PERTUSSIS WITH EUCHININ. (*Jahrb. für Kinderhk.*, April 4, 1908, p. 452.)

Until a year and a half ago the author employed quinin in the treatment of pertussis. This method of treatment yielded remarkably good results, but on account of the bitter taste of the drug the administration to children was found very difficult and often impossible. For the past year the author substituted euchinin for quinin and found that the former drug had the same effect, but was much more readily given. He treated 45 out of 84 children. The drug was used in the severe cases only. It was administered in sugar, in milk, or cold chocolate.

The usual dose was a centigram for each month and a decigram for each year, morning and night. The maximum dose was 4 decigrams. In young infants and in those children who could not be persuaded to take the drug by mouth, suppositories of the same dose were found equally as effectual. Under the influence of euchinin the attacks became milder, their number diminished, retching and vomiting ceased, cyanosis disappeared, and the duration of the disease was considerably shortened. In a few adult cases he observed idiosyncrasies similar to those of quinin. The author considers this drug a specific for pertussis.

HENRY HEIMAN.

SEIBERT, A.: PROPHYLAXIS IN EPIDEMIC CEREBROSPINAL MENINGITIS. (*Journal of American Medical Association,* November 16, 1907, p. 1,657.)

Seibert thus summarizes what we now know: (1) Epidemic cerebrospinal meningitis is communicable only by direct contact with fresh mucus from the nasopharynx of patients. (2) A person who has taken the germ from a patient may acquire meningitis. (3) Such a person may only acquire meningococcus pharyngitis and, thus acting as intermediary host, may carry this infection to others near and far. The author recommends the application of a solution of equal parts of resorcin and alcohol to disinfect the nasopharynx. The alcohol must be heated before the resorcin is added. Two applications, one past each side of the uvula, are sufficient. The stomach must be empty. The solution is said to destroy every organism it comes in contact with. The applications are best repeated every forty-eight hours. Six treatments will usually suffice. The author concludes that resorcin and alcohol should be used: (1) In the nasopharynx of the patient to prevent further absorption, as well as expectoration, of meningococci. (2) In all persons coming in contact with a patient, especially when postnasal catarrh is present.

G. R. PISEK.

FOSTER, E. EDWIN: THE INFLUENCE OF IMPERFECT NASAL RESPIRATION ON THE ORAL CAVITY. (*Annals of Rhinology, Otology and Laryngology,* September, 1907, p. 661.)

The importance of normal nasal respiration for the growing child cannot be too strongly urged. During this act, the lips are closed, the teeth are in contact and the tongue completely fills the mouth with the exception of a small space between the dorsum of the tongue and the hard and soft palate, where there is created a negative pressure of from 2 to 4 mm. The lips and cheeks on one side, and the tongue on the other, exert pressure on the alveolar arch.

Oral respiration, on the other hand, increases the tension of the cheeks, the lips are separated, the tongue lies on the floor of the mouth and the soft palate is drawn up. To maintain these abnormal positions there is hypertrophy of these muscles. The upper teeth become carious because they are deprived of most of the protection from the saliva and tongue, and this results secondarily in faulty digestion, impoverished blood, insufficient sleep, poor development of the facial bones and deformities of the upper maxilla resulting from lateral pressure.

The logical treatment in cases where the palatal deformity is due to nasal obstruction, is to remove the cause of the obstruction and then to correct the deformity. The degree of improvement after operation will depend upon the age of the child and the length of time that the deformity has existed. Many cases of congenitally narrow skull can be benefited by simply widening the palate. This will often straighten a deflected nasal septum. The combined efforts of the orthodontist and rhinologist are frequently required and the importance of working in conjunction is clearly established. S. W. THURBER.

HEIM, P., AND JOHN K.: CONCERNING THE INTERNAL ADMINISTRATION OF SALT SOLUTIONS IN THE TREATMENT OF ACUTE NUTRITIONAL DISTURBANCES OF INFANCY. (*Monats. f. Kinderhk.,* February, 1908.)

The authors urge the employment of large quantities of sodium chlorid solution by mouth in acute digestive disturbances. They have found that infants thus treated, and receiving no further nourishment, gain 100 to 600 grains a day. In order to make the solution less disagreeable to the taste, they add bicarbonate of soda, so that it will contain 5 grains of this drug and 5 grains of sodium chlorid to the liter, which constitutes the day's quota. The result of such treatment, in addition to the gain in weight, is highly favorable; the stools become less foul, the acidosis disappears, the fever is diminished, and the heart action becomes stronger. These results are claimed to be due to the sodium and to the alkaline constituent of the solution, and cannot be obtained by giving water either by mouth or by hypodermoclysis. In fact, the result obtained by vegetable preparations, sometimes used in these cases, are ascribed by these authors to their sodium content. ALFRED F. HESS.

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